

# modern machine shop

**PIGMY TO GIANT**

*See Page 106*

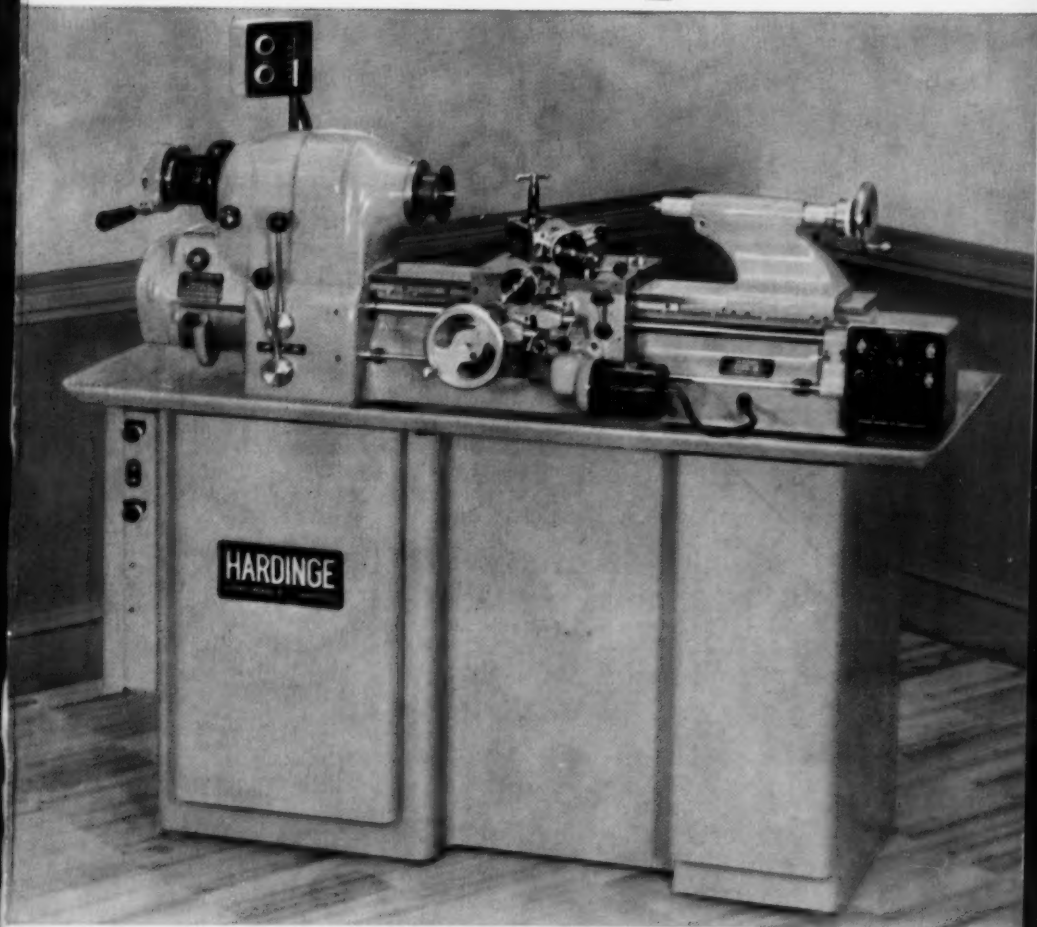
**THE BRAND-NEW  
SUPERVISOR**

*See Page 116*

**PRODUCTION BY  
COMPRESSED AIR**

*See Page 142*

**DEC. 1955**



**Closer Tolerances Increase Demand**  
for the **HARDINGE HLV TOOL ROOM LATHE**



# Decision at SPS

STANDARD PRESSED STEEL CO.  
JENKINTOWN, PENNA.



Standard Pressed Steel Company of Jenkintown, Pennsylvania is the world's largest manufacturer of Socket Screw Products, Cap Screws, Set Screws and a variety of other threaded fasteners. These SPS products are used on aircraft, home appliances, business machines, in fact, wherever products or components must be held together.

A continuing program of research and development at SPS assures a lasting place for the Company in America's future.

A moment of decision . . . after months of trial, weeks of conference . . .

It's ADAMAS . . . again . . . and it's no surprise that Adamas tungsten carbide is specified at SPS . . . for Adamas tungsten carbide products are subject to the world's most rigid set of quality control procedures.

Careful selection of materials lies at the heart of quality control at SPS. And, at SPS, where carbide is called upon for use in a great variety of applications, Adamas tungsten carbide is a logical choice . . . for there's an Adamas carbide grade for every job.

ADAMAS CARBIDE CORPORATION  
KENILWORTH, NEW JERSEY





DECEMBER

1955

Vol. 28

No. 7

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## modern machine shop

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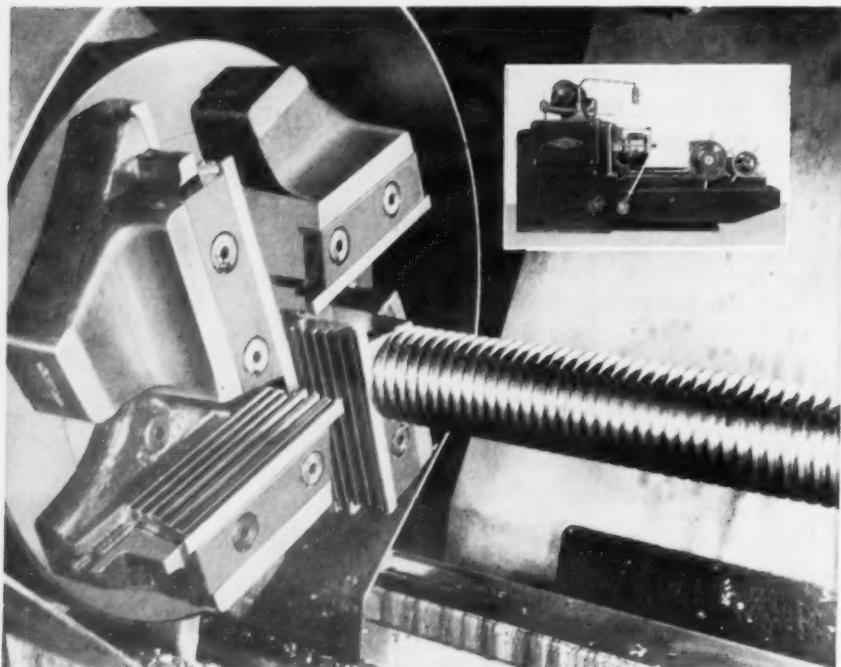
Member



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## 90% threading time saved on power screws

This large saving in the production of power screws at Rodney Hunt Machine Co. (Orange, Mass.) was made possible by the use of a LANDMACO Threading Machine.

Specifications require  $2\frac{3}{4}$ " diameter— $2\frac{1}{2}$  pitch Acme threads 56" long on cold-rolled steel. 5 hours had previously been required to complete the thread. Floor-to-floor threading time was cut to only 30 minutes after the installation of a LANDMACO 32C Single-Spindle Machine with a special 60" carriage travel.

Many features in the design of this equipment make it possible to do heavy duty threading to precision tolerances. Heavy construction and leadscrew feed assure accurate threading. Slippage of the work is prevented by an improved carriage front with 60% greater gripping power.

Massive construction of the 4" LANCO head and chaser-holders give maximum support to the chasers for the largest or smallest diameters. The tangential design of the chasers provides lateral absorption of cutting strains and free cutting action. Their roughing-and-finishing form assures threads of excellent finish in one pass, and the centering throats eliminate the out-of-roundness common in long workpieces.

This is but one example of the production economies to be derived from using LANDIS Equipment on large diameter threading. For additional information, please send specifications and ask for Bulletin #H-45.

413

**LANDIS Machine COMPANY**

WAYNESBORO • PENNSYLVANIA • U. S. A.

For more data circle 201 on Reader Service Card



# For Fast Accurate Setups

*These Taft-Peirce Specialties are a 'must' for machining and inspection in the toolroom*

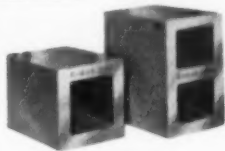
## V-BLOCKS



**Cast Iron V-Blocks**

Accurately ground to size in pairs. Made from finest quality seasoned grey iron castings. All surfaces except top are square or parallel with each other within .0005".

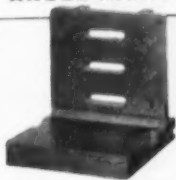
## PARALLELS



**Box Parallels**

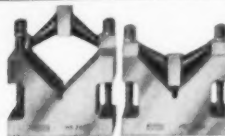
Made of finest quality close grained cast iron. All sizes are parallel within .00025" in 6 inches, square within .0005" in 6 inches. Will pair up within these limits.

## ANGLE IRONS



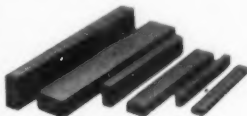
**Multiplex Angle Irons**

Save time by permitting a single setup of workpiece for many machining and inspection operations. All working surfaces scraped square within .0005" in 6", parallel within .0005".



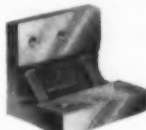
**Steel V-Blocks**

Sold in pairs only. Made of alloy steel, hardened and ground. "V" is central with sides, parallel with bottom, square with ends within .0003". All surfaces square or parallel within .0002".



**Steel Parallels**

Made of alloy steel, hardened and ground on four sides. Exceptionally durable and free from seasonal changes. Not made to be used as squares.



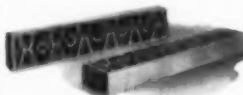
**Duplex Angle Irons**

Finished inner pads increase accuracy, speed setup work and usually eliminate need for table clamping. Inner pads parallel to sides within .0005". Outer faces square within .0005" in 6".



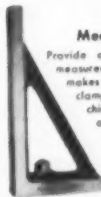
**Universal V-Blocks**

Hole in center permits quick, accurate setups. Also provides clearance for tool in drilling and boring. Made of alloy steel, hardened and ground on all working surfaces. All sides square within .0001". Sold singly or in pairs.



**Planer and Boring Mill Parallels**

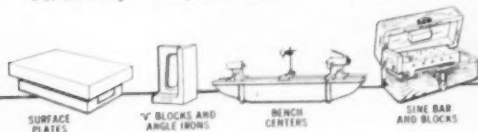
Made of finest quality cast iron. Width and thickness held within plus or minus .0005". Square within .0005" in 6 inches. Parallel within .0005" in total length.



**Measuring Irons**

Provide a fixed surface for measurements. Narrow width makes it convenient for clamping work on the machine table. Front face and bottom finished square within .0002" per foot.

*For the complete story on these items and many more send for your copy of the Taft-Peirce Handbook.*



THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, RHODE ISLAND

For more data circle 202 on Reader Service Card

December, 1955

modern machine shop 3



# NEW WILLIAMS LOCKING ADJUSTABLE WRENCH

with Features you  
Have Always  
Wanted in an  
Adjustable Wrench

- No Obstructions
- Structurally Sound
- Positive Lock
- Rapid Adjustment
- One Hand Operation
- No Fumbling
- Drop-Forged from Selected Alloy steel and Chrome Plated

**AVAILABLE  
AT NO EXTRA COST**



## IN FOUR MOST POPULAR SIZES

No.	Size	Capacity	List Price
6L	6"	$\frac{3}{4}$ "	\$2.06
8L	8"	$1\frac{1}{16}$ "	\$2.45
10L	10"	$1\frac{1}{8}$ "	\$3.10
12L	12"	$1\frac{3}{16}$ "	\$4.50

# WILLIAMS

## INDUSTRIAL TOOLS

*"The Broadest Line of Its Kind"*

WRITE for descriptive folder No. A-465. Also ask for Catalog 302 showing the latest patterns and sizes in Williams broad line of industrial tools.



you'll get  
SERVICE ON  
THE DOUBLE  
from your  
DISTRIBUTOR'S  
SALESMAN.  
He'll give  
you quickest  
delivery at  
lowest cost!

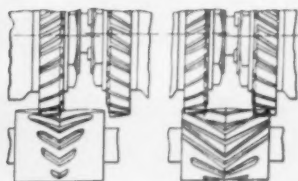
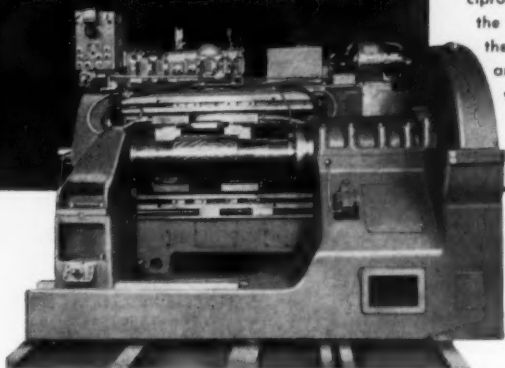
**J. H. WILLIAMS & CO., 408 Vulcan Street, Buffalo 7, N. Y.**

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# HOW TO "PRECISION GENERATE"

## GREATER PROFITS!



### PRECISION GENERATION

The Farrel-Sykes gear machine is equipped with two cutters mounted on a single carriage. The cutters reciprocate, each ending its stroke at the center of the blank. As they cut, they rotate to generate the helices and also slowly revolve in unison with the gear blank to generate the tooth contours precisely.

The speed, in operation and set-up, of a Farrel-Sykes "Twin-Head" gear generator, will cut your man and machine hours, and therefore decrease your manufacturing costs. New design features contribute to more efficient operation. Rapid selection of speeds and feeds, easy adjustment of cutters, easy and positive control of infeed, are examples.

And the accuracy inherent in the Farrel-Sykes process of gear gener-

ation assures accurate tooth spacing, profile and helix angle. The gears you make will operate smoothly, quietly and efficiently for many years to come.

The "Twin-Head" generator cuts all types of herringbone gears, single helical and spur gears, two members of a cluster gear simultaneously, and other toothed and cylindrical forms.

Ask for bulletin T-455.

**FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.**

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Cambridge (Mass.),  
Akron, Cleveland, Chicago, Los Angeles, Houston

FB-968

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# NOW . . . HONE INTERNAL BORES AUTOMATICALLY

WITH

## FULMER HONING MACHINES

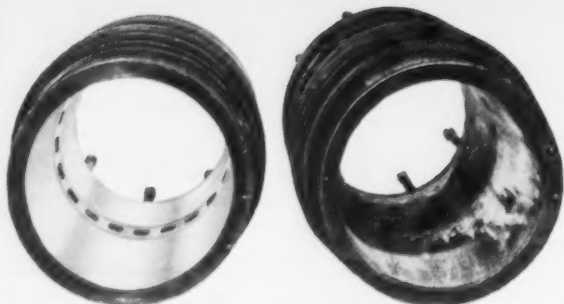


Illustration shows electromotive Diesel liner before and after being honed to .030" oversize

**FUNDAMENTALLY**  
the same rugged,  
work - devouring  
dependable hon-  
ing machines but  
with radical, im-  
portant changes.

You are assured:

**NEW AUTOMATIC** loading fixtures

**NEW AUTOMATIC** hone withdraw

**NEW AUTOMATIC** time cycle

**NEW AUTOMATIC** continuous,  
remote controlled feeding and retract-  
ing honing tools.

WRITE FOR DETAILS ABOUT  
THE NEW FEATURES

**SAVINGS ON OPERA-  
TOR'S TIME**

. . .

**LOWER COSTS**

. . .

**GREATLY INCREASED  
PRODUCTION**

. . .

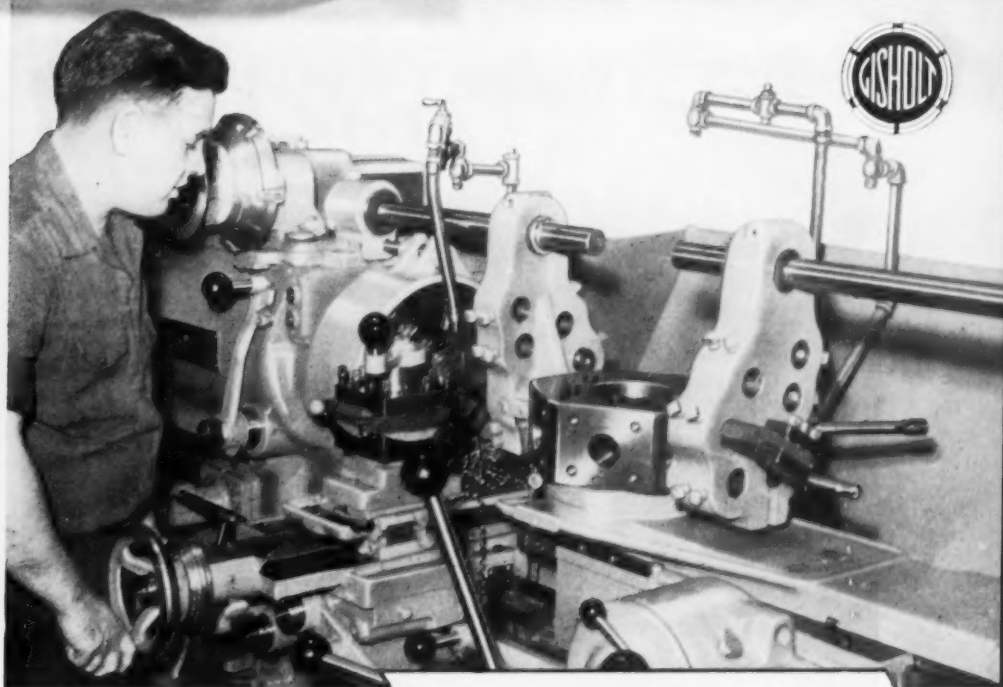
Available, of course, in  
regular manually oper-  
ated types.

# C. ALLEN FULMER CO.

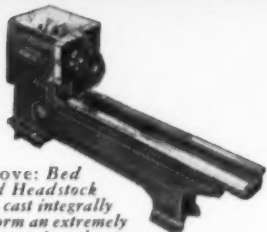
1233  
First  
National  
Bank Bldg.  
Cincinnati 2,  
Ohio

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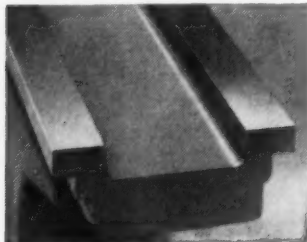


## ACCURACY that doesn't "wear off"



*Above: Bed and Headstock are cast integrally to form an extremely heavy unit and to provide the rigid foundation for all types of work.*

*Below: Block type ways are straddle keyed to the bed and ground in perfect alignment with the spindle. All working surfaces are hardened to 64-66 Rockwell "C".*



Here are two good reasons why you can count on the accuracy of Gisholt Turret Lathes—now and years from now.

One-piece bed and headstock, cast as a heavy, rigid unit, reduce distortion and vibration to a minimum. Headstock is jig-bored to insure—and maintain—perfect alignment of spindle and drive shafts, with ample metal to provide the most solid support possible.

Hardened steel ways are augmented by hardened steel strips secured to the ram saddle, as well as hardened steel gibs and clamps, making an assembly that is virtually wear-proof. Its accuracy is further preserved by force lubrication.

These advantages are yours for the long life of any Gisholt Turret Lathe. Ask for complete details.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



# GISHOLT

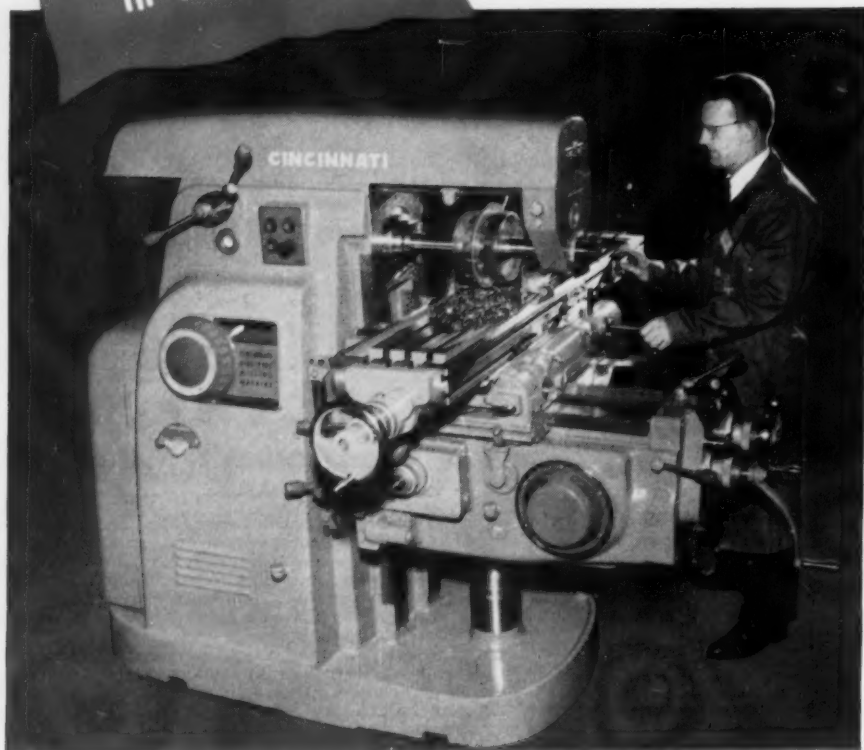
MACHINE COMPANY

Madison 10, Wisconsin



They'll be a Big Hit  
in Your Shop...

THE NEW



NEW CINCINNATI PLAIN DIAL TYPE MILLING  
MACHINE with Automatic Table Cycles

# CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING



# CINCINNATI DIAL TYPE MILLING MACHINES

The new Dial Types are bound to make a big hit in your shop... with the operator and foreman... with the methods engineer... with the new equipment analyst.

**The new Dial Types** are easier and safer than ever before to operate because of their dual push-button controls; complete safety; large speed and feed dials.

**The new Dial Types** have the capacity to take on more work than ever before... higher ranges of speeds and feeds (up to 90" per minute feed rate); more than 50% increase in power.

**The new Dial Types** will satisfy the most critical equipment analyst... built-in, completely protected electrical controls; feed drive motor, unit construction and cradle type mounting of main drive motor reduce maintenance expense; big variety of work, including high production jobs, can be assigned to the New Dial Types.

Everywhere you look you'll find new Dial Type features of value in your shop. Want more information? Write for your copy of publication No. M-1915.

**THE CINCINNATI MILLING MACHINE CO.**  
**CINCINNATI 9, OHIO**

**MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID**

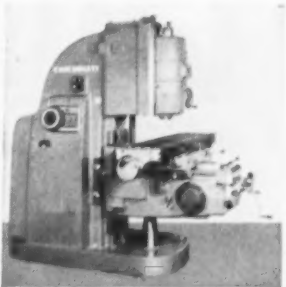
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December, 1955

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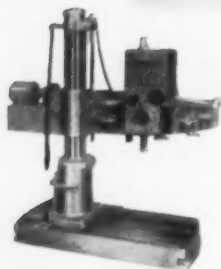
The New CINCINNATI No. 2  
Universal Dial Type Milling  
Machine



The New CINCINNATI No. 3  
Vertical Dial Type Milling  
Machine

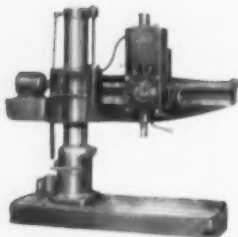






# FIRST WITH HARDENED COLUMNS

## for 9" and 11" radials



Now, for the first time, you can gain the advantages of hardened columns on radial drilling machines with 9" and 11" columns. Because they resist scoring and hold dimensional accuracy under most extreme conditions, these new columns may well add years of service to our machines.

We offer them to industry only after several years of experimenting and testing have proved our procedure. After we turn the cast columns, we flame-harden them to Rockwell C 52-56, at a depth of  $\frac{1}{16}$ " to  $\frac{1}{8}$ ". Then we finish grind them to close tolerances in straightness, roundness, and surface finish.

It will be worth your time to write us today.  
*The Cincinnati Gilbert Machine Tool Co.*  
3366 Beekman St., Cincinnati 23, Ohio

A 3' arm 9" column radial can be purchased for as little as \$1100 down and \$80.67 a month for five years. Includes 6% simple interest (or about 3% add-on).

*those who buy Gilbert buy* **GILBERT** *again*

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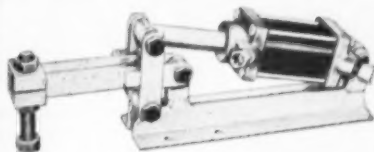
## HEAVY-DUTY AIR (or Oil) CLAMPS

If you are developing a fixture to hold an automobile panel or other large assembly, it's a good idea to have the clamps rated to the job they're expected to do. In other words, never send a boy to do a man's job!

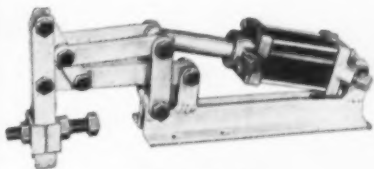
You can get husky, heavy-duty clamps from Lapeer—clamps which are built to stand up under the knocks and abuses of busy production lines. These clamps are air or oil operated—designed to grab tightly, let go quickly. Failure of air or oil pressure will not release the clamps, thus eliminating the possibility of scrappage.

Pictured are just two of several heavy-duty models available.

*Never send a boy  
TO DO A  
MAN'S JOB*



AO-400 (HD)



AODT-400 (HD)  
Double-Toggle Type

**SEND FOR  
OUR CATALOG  
NOW!**



Manufacturers of a complete line of Stationary and Portable Clamps and Pliers

**KNU-VISE  
PRODUCTS**

**LAPEER MANUFACTURING CO.**

**3048 DAVISON ROAD**

**LAPEER, MICHIGAN**

WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

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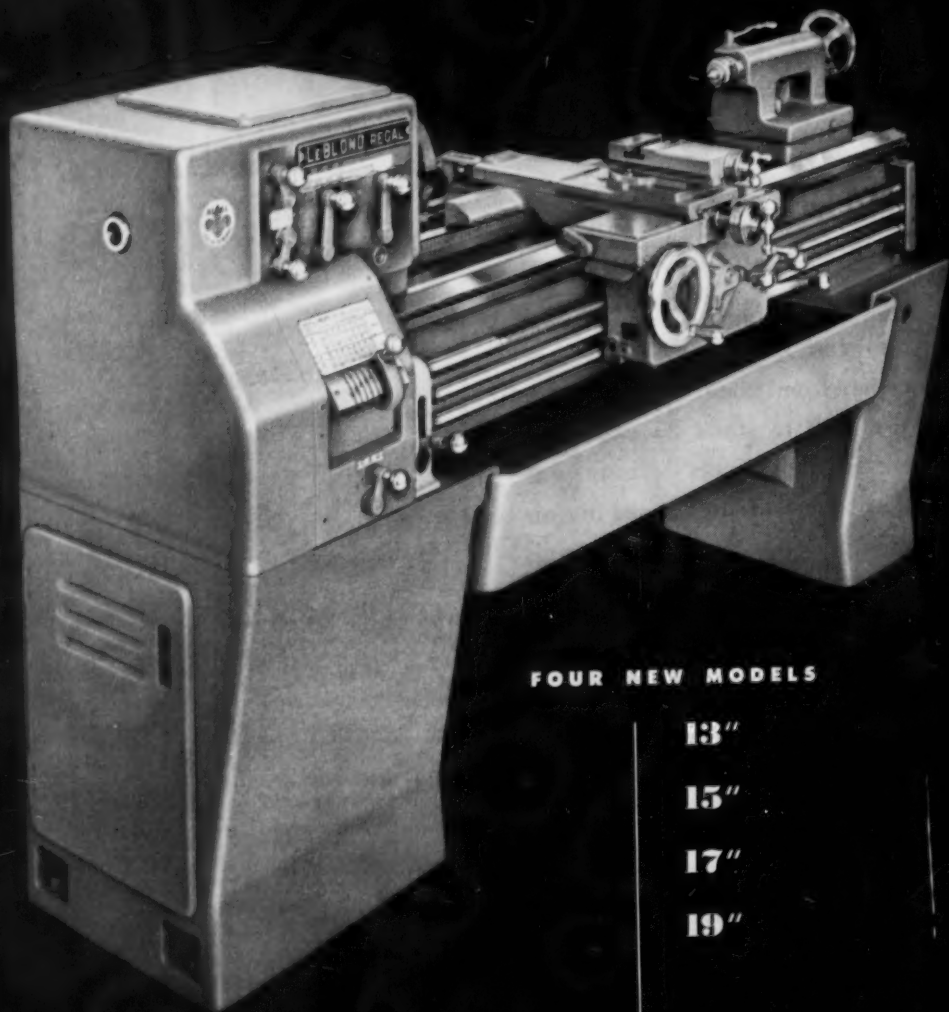
December, 1955

modern machine shop 11



*cut with confidence . . .*

# HERE'S THE



FOUR NEW MODELS

13"

15"

17"

19"

15" Regal shown



# NEW LEBLOND REGAL

*The only lathe in its class with so many big-lathe features*

Designed and built like heavy-duty lathes, the new LeBlond Regals will give you long life of precision production, minimum maintenance and the kind of dependability you'd expect from a much higher-priced machine!

Consider, for example, the new Regal headstock. It uses the same combination gear-belt drive construction that proved itself on the famous LeBlond Dual-Drive and is now incorporated on our new 16" heavy-duty lathe. Then take a look at the new bed with hardened and ground replaceable steel ways. Like the ways on our heavy-duty machines, they are fitted according to the compensating vee-way principle to insure better distribution of forces for proven long-time accuracy and minimum wear.

Again, like higher-priced lathes, Regals are equipped with *both* feed rod and leadscrew for continued accuracy in thread chasing. Other big-lathe features—3-bearing spindle. Automatically lubricated quick-change box. Wide carriage bridge with ample bearing surface. Rugged tailstock with plug clamping. Plus general dimensions and construction details patterned after LeBlond heavy-duty lathes.

Only from the builder of a complete line of lathes can you get a low-priced lathe with true big-lathe features. All of LeBlond's 68 years of experience has gone into the design and building of these new Regals. Be sure you get all the details; see your LeBlond Distributor or write for Bulletin R-200-A.

	13"	15"	17"	19"
Swing over bed and carriage wings	14"	15½"	17¾"	19¼"
Spindle speeds, number	12	12	12	12
Spindle speed range, rpm.	45 to 1800	30 to 1200	38 to 1500	25 to 1000
Feeds and threads, number	48	48	48	48
Feed, range, in. per rev.	.0018—106		.002—116	
Threads per inch, range	4—224		2—112	
Horsepower	2	3	3	5

*... cut with confidence*

THE R. K. LEBLOND MACHINE TOOL COMPANY  
CINCINNATI 8, OHIO



WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • FOR MORE THAN 68 YEARS









## 35-year-old Niles mill

**sells Elliott**

## new Niles 30-ft. boring mill

The remarkable performance since 1920 of a Niles 20-ft. vertical boring mill was responsible for Elliott Company's selection of a new, modern Niles 30-ft. mill. Installed primarily for machining blowers, turbines and condensers built at their Jeannette, Pa. plant, and large generator stator frames for their Ridgeway Division, this large vertical boring mill is also available for outside contract work.

The new Niles has a 16-ft. clearance under the crossrail. It's equipped with two 9-ft. travel rams and a 19-ft. 6-in. table. Other features include electronic feed control and electrically operated clamps which minimize set-up time and hold settings rigidly accurate. Over-counterweighing the rams takes up backlash in the feed gears at all times, thus insuring dimensional tolerances within .001 and .002 to be maintained across large surfaces.

Elliott also expects to use such other features as compound feeding and 60° swing of the boring rams to install electronic-hydraulic duplicating equipment on the mill. This will enable them to do contour or profiling work, thus increasing the machine's versatility and adaptability for a wide variety of work.

You too will find these exclusive features of Niles machine tools all add up to greater production and higher quality. For further details write today for our new eight-page booklet. Hamilton Division, Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio.



**Hamilton Division**

**BALDWIN-LIMA-HAMILTON**

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**now, a great new**



**DELTA, world's most complete line of power tools**  
**53 machines... 246 models... over 1300 accessories**



ROCKWELL-BUILT

long-bed

# DELTA

## 11" metal cutting lathe

- ... new, big capacity 5-foot bed—plus all of the exclusive Delta quality features that have gained industry-wide acceptance for the standard model.
- ... designed for production work as well as tool rooms and experimental shops—lets you handle many production jobs that normally would require far more expensive machines.
- ... combines real precision for close control, with extra ruggedness for heavy duty service—all at a price so low it's almost unbelievable!

*See it! Compare it! Get all the facts about it! Then—make up your own mind! Your Delta Dealer is listed under "TOOLS" in the classified pages of your phone book. Send the coupon for complete details—today!*



**DELTA** QUALITY POWER TOOLS

Another Product by **Rockwell**



**Send Coupon For All The Facts!**

**DELTA  
QUALITY  
COSTS  
NO  
MORE**

Delta Power Tool Division, Rockwell Manufacturing Co.  
606M N. Lexington Avenue, Pittsburgh 8, Pa.

- ☐ Please send name of my nearest Delta Dealer.
- ☐ Please send Delta AB Catalog on the new long-bed Delta 11" metal lathe.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ County \_\_\_\_\_ State \_\_\_\_\_





# TRY and COMPARE PANTHER 5 TOOL BITS FOR YOURSELF



**Here's what you GET in Panther 5 . . .** A high-carbon, high-vanadium, tungsten-bearing high speed steel with 5% cobalt. Its analysis is designed to give this grade the highest red-hardness and abrasion-resistance of any high speed steel.

**Here's how it can HELP you . . .** This combination of highly valuable properties gives Panther 5 exceptional ability to resist wear, yet it also possesses good toughness and edge strength. Put Panther 5 Tool Bits on your heavy-duty jobs and abrasive materials—*watch them step up your production runs between grinds!*

**Stocked in ALL SIZES . . .** Panther 5 Tool Bits are produced as a finish-ground product. They're carried in stock for immediate shipment in nine sizes of squares, from  $\frac{1}{4}$ " x  $2\frac{1}{2}$ " long to 1" x 7" long . . . and in eighteen sizes of flats, ranging from  $\frac{3}{16}$ " x  $\frac{1}{4}$ " x 3" long to  $1\frac{1}{2}$ " x  $\frac{1}{4}$ " x 7" long. • *Why not get in a trial order—see for yourself what they'll do!* Check your nearest AL representative or distributor . . . or write Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

## Valuable Data for PRODUCTION MEN ...yours for the asking

### 1. "HIGH SPEED TOOL BITS"

Handy data on the complete AL line, comprising eight different grades of high speed steel tool bits. Includes shop handling, heat treat methods, etc.

### 2. "CUTTING TOOL MATERIALS"

This 36-page booklet analyzes and compares all AL grades of cutting tools—carbon and high speed steel, cast alloy and carbides. Includes data on handling and treatment.

ADDRESS DEPT. MS-72

For complete MODERN Tooling, call  
**Allegheny Ludlum**



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# No line of Dial Snap Gages offers so much!

## Paralloc SERIES

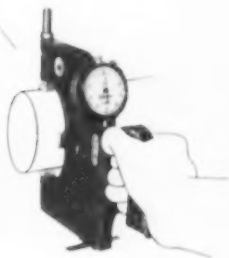
Paralloc Dial Snap Gages, available in types "D" and "L", feature *large square anvils* (tungsten carbide faced) which are *flat and parallel*. The D-TYPE, available in eight sizes up to 8 inches, is a truly modern general purpose design, embodying many unusual features including an adjustable plunger tension. The L-TYPE, available in sizes up to 14 inches, which has a 100% shockproof movement actuated by the lower anvil, is designed for the toughest of long run jobs.

Light in weight, rugged in construction, Paralloc Dial Snap Gages are designed to withstand severe usage. The Paralloc pin locking mechanism preserves the parallelism of the anvil faces throughout the adjustment range to an exceptional degree of accuracy.



Paralloc®  
D-TYPE

Paralloc®  
L-TYPE



## **NEW!** Dializer SF SERIES

Here is a new line of lightweight, long range Dial Snap Gages which feature *low cost* precision. Nine sizes up to 13½ inches. Upper anvil is spherical, lower anvil is flat; both anvils are faced with tungsten carbide. Settings are easily accomplished with a fine adjustment screw. Other features include provision for rotating the indicator and an adjustable contact pressure. Wide choice of indicator sizes and graduations.

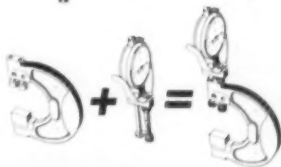
## Dializers®

Here is the ultimate in *economy*: Any make of Adjustable Limit Snap Gage conforming to American Gage Design specifications becomes a *modern dial snap gage* when equipped with STANDARD's Dializer.

*Write for details and prices  
to meet your specific needs.*



SF-TYPE



**STANDARD GAGE COMPANY, INC.**

64 PARKER AVENUE



POUGHKEEPSIE, N.Y.

For more data circle 218 on Reader Service Card



# Never Confuse the No. 8 MARVEL with an ordinary Band Saw ...only the MARVEL is Universal



Only on a No. 8 MARVEL can the saw column be instantly indexed and locked at any angle from 45° right to 45° left, and the saw then fed thru the work at the desired angle — without moving the work.



Only a No. 8 MARVEL can do all of these things: Snip-off a 1/8" rod or cut-off an 18" x 18" cross section.



Rough to Size and Shape



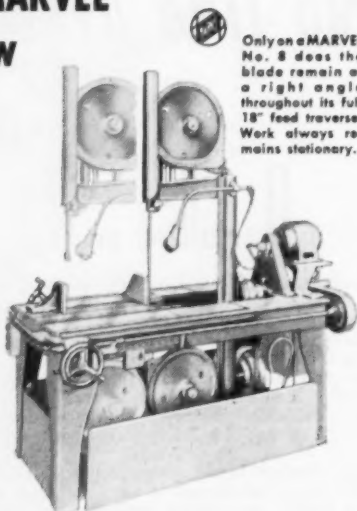
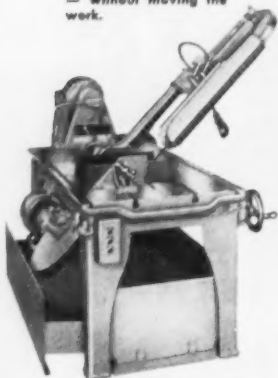
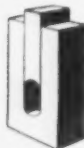
Miter



Index



cut off and shape Structural Beams



Only on a MARVEL No. 8 does the blade remain at a right angle throughout its full 18" feed traverse. Work always remains stationary.



Only a No. 8 MARVEL has the large T-slotted work table, with removable quick action vise, that permits accurate set-ups of work of unrestricted sizes and shapes, special fixtures, etc.

## "Rough Machine" to size and shape with minimum chip waste

The No. 8 MARVEL is the "busiest tool in the shop" wherever installed because it is a *universal* tool—has both the capacity and the versatility to handle not only standard sawing jobs but innumerable "trick" and convenience jobs as well. More than a metal saw, the No. 8 MARVEL is a fine machine tool with machine tool features like: Both power and hand feeds; Depth Stops; Automatic Blade Tension; Built-in Coolant Pump; Three operating speeds (or six with 2-speed motor). Moisture-proof electrical controls that conform to both "J.I.C." and "MACHINE TOOL" electrical standards; Dirt-proof ball bearings, etc.

If you cut, machine or fabricate metal, this is a sawing machine you should know about. Write for catalog.



ARMSTRONG-BLUM MFG. CO. • 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

For more data circle 219 on Reader Service Card

20 modern machine shop

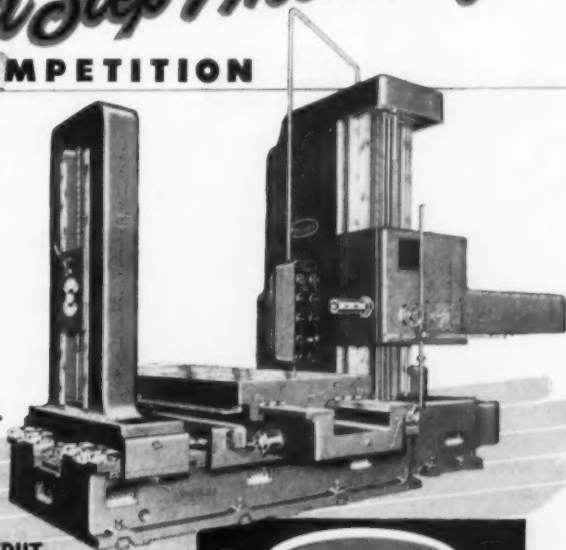
December, 1955



**KEEP YOUR PRODUCT**

# *a Step Ahead of* **COMPETITION**

**THROUGH  
LOWER COSTS ...  
INCREASE  
EFFICIENCY ...  
GREATER  
PRODUCTION OUTPUT ...**



Unless your present equipment is as modern as the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, you are not employing all of today's engineering achievements to your manufacturing methods.

You owe it to yourself to investigate the many advantages to be gained by using the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75 in your plant.



#### HERE ARE SOME OF ITS FEATURES:

**PENDANT CONTROL** — complete machine control from a movable pendant station. Feed and speed rate selection, directional feed and traverse engagement of the spindle, head, table and saddle, spindle rotation and operation of head binders are accomplished from the Pendant.

**BOTH SCREW AND RACK FEED** — to the spindle provide smooth, steady screw feed for boring and sensitive hand feed for small drilling and tapping.

**SPEED RANGES** — 9.5 to 2032 R.P.M. on 3"; 7 to 1510

R.P.M. on 4" standard and 5.8 to 1209 R.P.M. on 4" heavy duty and 5" sizes, meets any machining requirement.

**RIGIDITY** — is built into the massive 4-Way Bed, Head, Headpost and Rear Post assuring a higher degree of maintained accuracy.

**OPTICAL MEASURING EQUIPMENT** — for head and table (optional)

**AUTOMATIC POSITIONING** — for head and table (optional)

FOR COMPLETE INFORMATION WRITE FOR CATALOG HBM-75 OR CALL YOUR NEAREST BULLARD SALES OFFICE OR DISTRIBUTOR.

## **THE BULLARD COMPANY**

**BRIDGEPORT 2, CONNECTICUT**

For more data circle 220 on Reader Service Card

December, 1955

modern machine shop 21





**Standard machine equipped  
with a standard vertical  
bracket**

## **7 HOLES AT ONCE WITH A STANDARD RADIAL HOLE DRILLING MACHINE**

Why build a special machine for drilling radial holes when a standard machine equipped with Govro-Nelson Automatic Drilling Units will, in many cases, perform the work of a special machine that would cost considerably more!

Any number of drilling units up to eight may be employed, the units being movable not only through 360 degrees on the circular table but also movable endwise on riser plates to meet the requirements of the part being drilled.

The machine may also be used for tapping operations with Govro-Nelson Tapping Units. It has a range of 1/32" to 3/8" on drilling operations and 0-80 to 3/8-16 on tapping operations, depending on material and spindle speeds. A single, momentary contact start-button causes all units to operate simultaneously.

If you are interested in reducing the cost of your radial drilling and tapping operations, write for price and dimensional data.

**WRITE FOR  
*Literature***

### **GOVRO-NELSON CO.**

*Machinists of Precision Parts for 32 Years*

**1933 Antoinette  
Detroit 8, Mich.**

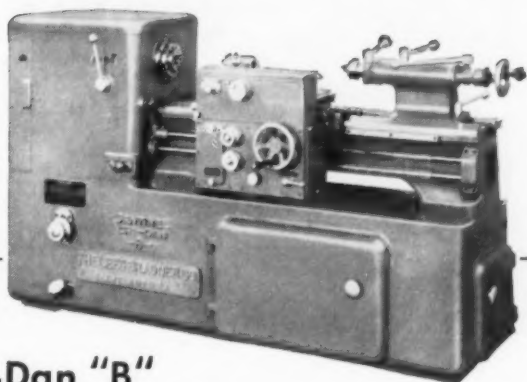
*Automatic* **DRILLING UNIT**

For more data circle 221 on Reader Service Card



# Threading Problem?

## Here's the answer!



### Cri-Dan "B" single-point threading machine

Rugged, versatile and FAST, the Cri-Dan threading machine will consistently produce class 3 threads from 8 to 40 TPI, right or left-hand, single or multi-start, internal or external.

Production runs? Semi-automatic operation makes them a cinch! Job lots? 15 minute change over and simplicity of tooling cut your costs on small lot runs, too!

Get the full story—call your local Lees-Bradner representative. Or write us direct.

CRI-DAN DIVISION

*the* **LEES-BRADNER** <sup>®</sup>  
CLEVELAND 11, OHIO, U.S.A. *Company*

For more data circle 222 on Reader Service Card





**ONLY  
\$985<sup>00</sup>**

Large work capacity, sturdy, precision construction and optic arrangement which permits use in bright light in the shop. Ideal for shops using mechanical measuring methods because they haven't been able to afford the luxury of an optical comparator.

# **Covel** *Optical* **COMPARATOR**

**New, low-priced  
contour projector for  
quick, economical  
precision inspection**

**FOR ACCURATE CHECKING  
RIGHT IN THE SHOP**

**SEND TODAY FOR  
DESCRIPTIVE BULLETIN**

**M-125**



## **Covel** **MANUFACTURING COMPANY**

**BENTON HARBOR, MICHIGAN**

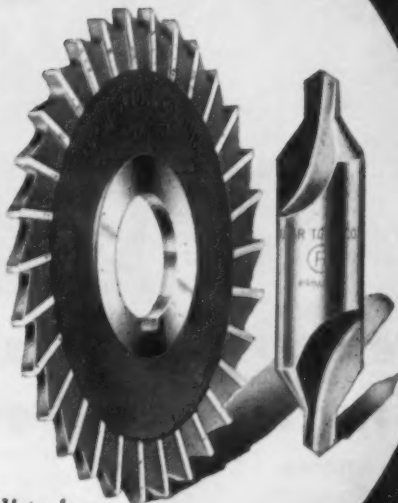
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# Have you seen

## Our NEW CATALOG N?

In our definitive new catalog you'll find Circle R products pictured and fully described, with size and price listings, ordering instructions, and helpful data on speeds and feeds for most effective metal cutting. As specialists, we make nothing but circular metal cutting tools — the finest you can buy, though they cost no more. We are consultants on metal-cutting problems throughout industry, with particular reference to the new problems of automation. Ask for your free reference copy of Catalog N. Write direct or contact our Circle R Specialists in your district.



... Consult

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### CIRCULAR TOOL CO., INC.

PROVIDENCE 5, RHODE ISLAND

*Specialists in*

*Circular Cutting Tools Since 1923*

METAL SLITTING SAWS  
COPPER SLITTING SAWS  
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CUT OFF SAWS • CIRCULAR  
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SAWS • SOLID & TIPPED  
TUNGSTEN CARBIDE SAWS  
COMBINED DRILLS & COUNT-  
ERSINKS • CENTER REAMERS

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December, 1955

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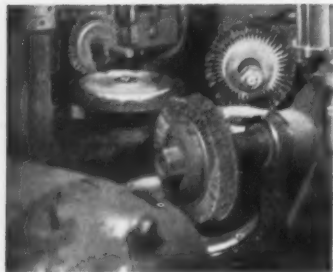
BEFORE  
BURR  
REMOVAL



AFTER  
BURR REMOVAL



## Removing burrs for trouble-free transmissions




One of many automatic brushing setups used by automotive manufacturers to finish transmission parts and other components.

**B**URRS left on automatic transmission parts can break loose in service, clog hydraulic lines and cause serious damage.

The two sections of a transmission cover shown above prove how thoroughly power brushing removes burrs and blends surface junctures . . . leaves the part smooth and clean.

Have an **Osborn Brushing Analysis** made of your operations. It costs you nothing, but may save thousands of dollars in your finishing of parts. Write *The Osborn Manufacturing Company, Department B-1, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

**Osborn Brushes** 



BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES  
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

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**built-in features assure continuous operation for longer periods!**

On job after job—in shop after shop—the reaction is the same: "Procunier heads are producing and lasting far beyond expectations." And no wonder! They're more than just tappers, they're precision instruments, carefully machined, accurately ground, balanced, pre-tested. Rugged, sensitive, they combine advanced features and advantages that mean just one thing—more production for less. Procunier heads give you sustained operation at faster speeds; unparalleled accuracy, fewer broken taps; less spoiled pieces; perfection in produced parts, and less operator fatigue.

Here's why you get EXTRA TAPPING HOURS: heads mount rigidly eliminating chatter and vibration; sensitive friction clutch automatically regulates driving pressure; ball bearings assure smoother, longer lasting "driving"; heat treated gears with special gear reversing mechanism; unique tap holding spindle support PLUS other important features.

**Write for FREE Brochure**

giving complete details and specifications on the complete line of Procunier Tapping Heads.

**PROCUNIER  
SAFETY CHUCK COMPANY**

**12 S. CLINTON ST., DEPT. 12,  
CHICAGO 6, ILL.**



**Exclusive  
"TRU-GRIP"  
Tap Holder**

is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

**PROCUNIER SAFETY CHUCK CO.**

12 S. Clinton St., Chicago 6, Ill., Dept. 12

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

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# Wilson "Rockwell"™\* Hardness Testers



Tests with  
**INCREASED  
SPEED...**  
**Accurately**

Y Model Motorized  
Hardness Tester

**Requires fewer  
operating steps . . . Because IT'S MOTORIZED!**

Here is the motorized operating procedure:

- 1 Place specimen on anvil or table.
- 2 Elevate test piece into test position. (With the new Set-O-Matic Dial Gauge, the large pointer will then automatically point to zero.)
- 3 Tap depressor bar to apply Major Load. When Major Load is fully applied, the Motorized Mechanism takes over—completes the test cycle

—removes the Major Load.

- 4 Read "Rockwell" Hardness Number. Then, lower elevating screw to remove test piece.

For complete information about the complete line of WILSON "Rockwell" Hardness Testers, write or call today. A WILSON hardness testing expert is available to consult on your specific requirement.

\*Trade mark registered



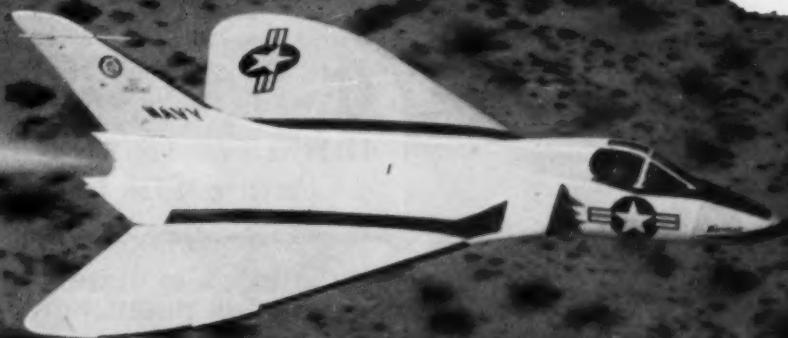
Wilson Mechanical Instrument Division  
**AMERICAN CHAIN & CABLE**

230-G Park Avenue, New York 17, N. Y.

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**SUPERSONIC... the Douglas F4D "Skyray"**  
*breaks the sound barrier at speeds of over 750 m. p. h.*

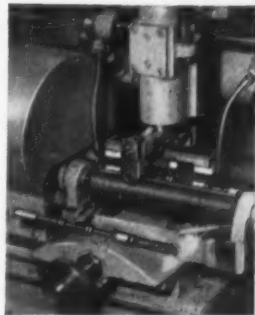
## **...and GISHOLT SUPERFINISH breaks another cost barrier!**

Do you think of SUPERFINISH as an expensive process? Then it's high time you know the facts.

Here's an excellent case in point ... on the record-breaking Douglas "Skyray." Among the most precise parts on this supersonic jet are the slide valves. They're ground from the solid, first on a cylindrical grinder, then on a centerless grinder. Then they're transferred to a Gisholt Superfinisher where

the bearing surfaces get a finish of 3 micro-inches, r.m.s. Former time for hand-lapping ran from 2½ to 3 hours per piece. The Gisholt SUPERFINISHER does it in 45 seconds! Think of it: less than 1/200th of the time! And think what that does to costs!

If SUPERFINISH can improve your product, as probably it can, better get the facts. Write today for complete information — ask for "Superfinishers," Form 1169.



Approximate diam. of slide valves (lower left) is ½" with reduced diam. of ¼" between collars, or bearing surfaces. Parts are handled on the Gisholt Superfinisher in only 45 seconds per piece.

**GISHOLT ROUND TABLE**

represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.



# **GISHOLT**

**MACHINE COMPANY**

**Madison 10, Wisconsin**

**TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES**





# Logan RFL unit

**Keeps Your Air-Operated Equipment  
Working At Full Capacity**

**MAINTAINS UNIFORM AIR PRESSURE, FILTERS AIR,  
LUBRICATES AIR CYLINDERS, VALVES, TOOLS**

## WHAT IT DOES

To assure capacity performance under all conditions, install the new Logan "R-F-L Unit" wherever air power is used in your plant and on the equipment you are marketing. Uniform working pressure is maintained by leveling out surges and sudden drops in the air supply. Clean, moisture-free, oiled air is supplied to assure unfailing operation, minimize wear of working parts, and increase service life of packings. The R-F-L Unit is installed in the intake line from the main air line, and can be mounted on a central control panel. Its compact, clean lines harmonize with the modern styling of your latest equipment. All components are conveniently visible on and controlled from the front panel. The upper and center knobs regulate the air pressure and oil flow, respectively—the lower knob drains the water trap.

## FUNCTIONAL FEATURES

- Long life piston-type reducing valve with long travel for accurate regulation of air pressure. Pressure gauge.
- Lubricator with control knob, oil level sight glass and filler plug located on front panel of unit.
- Removable ribbon-type air filter element to trap scale, rust, other foreign matter and water. Large water reservoir.

**REGULATOR**—Piston-type reducing valve with long travel of control permits accurate regulation of pressure from main air line as required by work. Keeps working pressure uniform with minimum air consumption.

**FILTER**—Supplies clean, dry air to system, thus assuring uniform and trouble-free operation. Replaceable filter element separates scale, rust and other foreign matter from air. Moisture drips into a reservoir which requires draining only once or twice a week.

**LUBRICATOR**—Automatically injects oil into air intake line to lubricate valves and cylinders, prevent corrosion and increase life of parts and packing. Metering needle adjustable as required by installation.

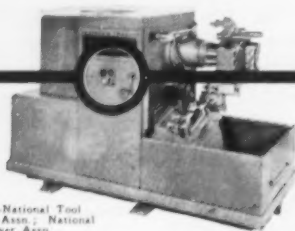
*Eliminates piping, elbows, tees and reducers between components. No pipe friction.*

## HOW IT IS CONTROLLED

Two knobs on front panel accurately regulate air pressure and amount of oil injected as required by the individual job.

## HOW IT IS INSTALLED

Install in the air intake line from the main air line. Can be mounted on a central control panel.



Member—National Tool  
Builders Assn.; National  
Fluid Power Assn.

Illustrated—Single  
spindle automatic  
chucking machine  
with Logan R-F-L  
Unit installation.  
Photo courtesy  
Warner & Swasey Co.



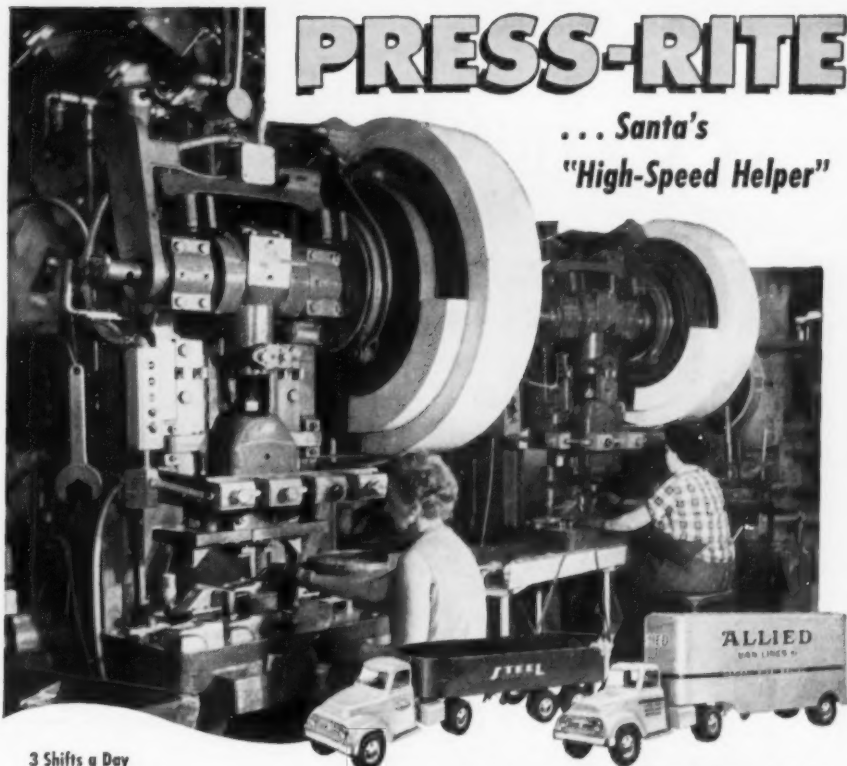
**LOGANSFORD MACHINE CO., INC.  
801 CENTER AVE., LOGANSFORD, IND.**

*Let Logan engineers help you design your  
Air and Hydraulic Circuits. No obligation.*

AIR CONTROL VALVES, Cat. 100-4 • AIR CHUCKS, Cat. 70-1 • AIR CYLINDERS, Cat. 100-1 • AIR DRAULIC CYLINDERS, Cat. 100-3  
AIR and HYDRAULIC PRESSES, Cat. 51 • COLLET GRIP TUBE FITTINGS, Cat. 200-5 • HYDRAULIC CONTROL VALVES, Cat. 200-4  
HYDRAULIC CYLINDERS, Cat. 200-2, 200-3 • HYDRAULIC POWER UNITS, Cat. 200-1 • SURE FLOW COOLANT PUMPS, Cat. 62

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# PRESS-RITE

... Santa's  
"High-Speed Helper"

3 Shifts a Day  
Seven Days a Week  
that's the year 'round  
schedule at  
Tonka Toys

**True-to-life** truck bodies are made of 20 gauge steel drawn to a depth of 2 $\frac{3}{4}$  inches.

Chassis, cabs, wheels, etc., are turned out by the thousands at Tonka Toys ... and each one has to be perfect to pass the critical inspection of today's boys and girls.

**Press-Rite Presses do the job better**  
**Increased Die Life** ... the experience of Tonka Toys proves that Press-Rite's tie rod frame design gives rigidity that really pays off in reducing costly die wear. You get longer runs between die grinds and keep dies at peak efficiency. The Press-Rite Airflex Clutch protects dies against accidental breakage as air-pressure is adjusted for-the-job and allows the clutch to slip on "double headers"

## ALL-OUT PRODUCTION at the TONKA TOYS Factory

Mound Metalcraft Company, the home of Tonka Toys, is now one of America's leading toy manufacturers. Their rapid growth is symbolized by their "repeat orders" year after year for additional Press-Rite Presses.

**Press-Rite Presses** ... that's the combination that the folks at Tonka  
**... Airflex Clutches** Toys have found gives them the highest production ... at the lowest cost per unit.

**PRESS-RITE** has many exclusive features to make it today's TOP PRESS VALUE. Send for Catalog Today—get the money-saving facts on the Press-Rite Line. Speed Production and Cut Costs in your plant.

### SALES SERVICE MACHINE TOOL CO.

2355 University Ave., St. Paul 14, Minn.

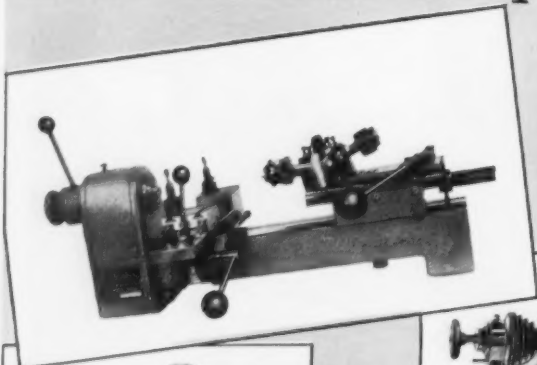
# PRESS-RITE

OPEN BACK • INCLINABLE Power Presses  
Used by more ... for more production

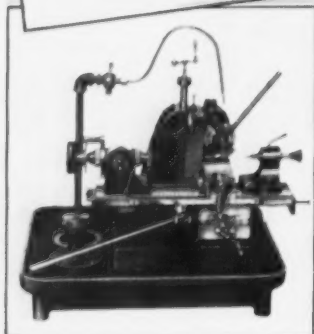
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# Derbyshire *fine precision equipment*

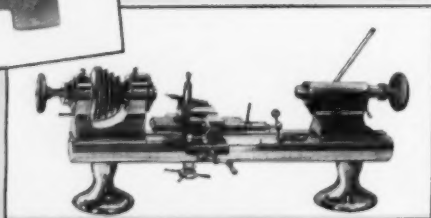


**MODEL No. 750**  
**BED 22"**  
CENTER HEIGHT — 7.50 CM  
COLLET CAPACITY — .315"

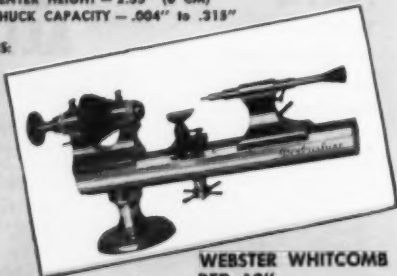


## MICROMILL

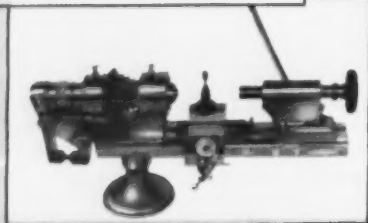
2 TABLE SURFACES:  
7 1/4" x 2 1/4"  
12" x 2 1/4"  
TAKES  
MAGNUS  
COLLETS



**ELECT LATHE — 18" BED**  
CENTER HEIGHT — 2.35" (6 CM)  
CHUCK CAPACITY — .004" to .315"



**WEBSTER WHITCOMB**  
**BED 12"**  
CENTER HEIGHT — 5 CM  
COLLET CAPACITY — .1969"



**MAGNUS LATHE — 12" BED**  
CENTER HEIGHT — 5 CM  
COLLET CAPACITY — .315"

**F. W. DERBYSHIRE, INC.**

157 HIGH ST.

WALTHAM

MASS.

Write for full details

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# READER SERVICE CARD

December 1955 Issue

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Your Title \_\_\_\_\_

Company Name \_\_\_\_\_

Company Address \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_ State \_\_\_\_\_

Products Manufactured \_\_\_\_\_

Number of Plant Employees \_\_\_\_\_

Circle KEY numbers (NOT PAGE NUMBERS) for more information on items described or advertised in this issue.

431 Main Street  
Cincinnati 2, Ohio

**modern  
machine  
shop**

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213	232	251	270	289		359	378	397	416	435	454	473	492	511	530	549	568	587	606
214	233	252	271	290		360	379	398	417	436	455	474	493	512	531	550	569	588	607
215	234	253	272	291		361	380	399	418	437	456	475	494	513	532	551	570	589	608
216	235	254	273	292		362	381	400	419	438	457	476	495	514	533	552	571	590	609
217	236	255	274	293		363	382	401	420	439	458	477	496	515	534	553	572	591	610
218	237	256	275	294		364	383	402	421	440	459	478	497	516	535	554	573	592	611
219	238	257	276	295		365	384	403	422	441	460	479	498	517	536	555	574	593	612



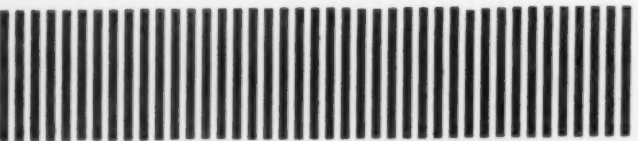
**FIRST CLASS**  
**PERMIT No. 7414**  
**NEW YORK, N. Y.**

**BUSINESS REPLY CARD**  
*No Postage Stamp Necessary If Mailed in the United States*

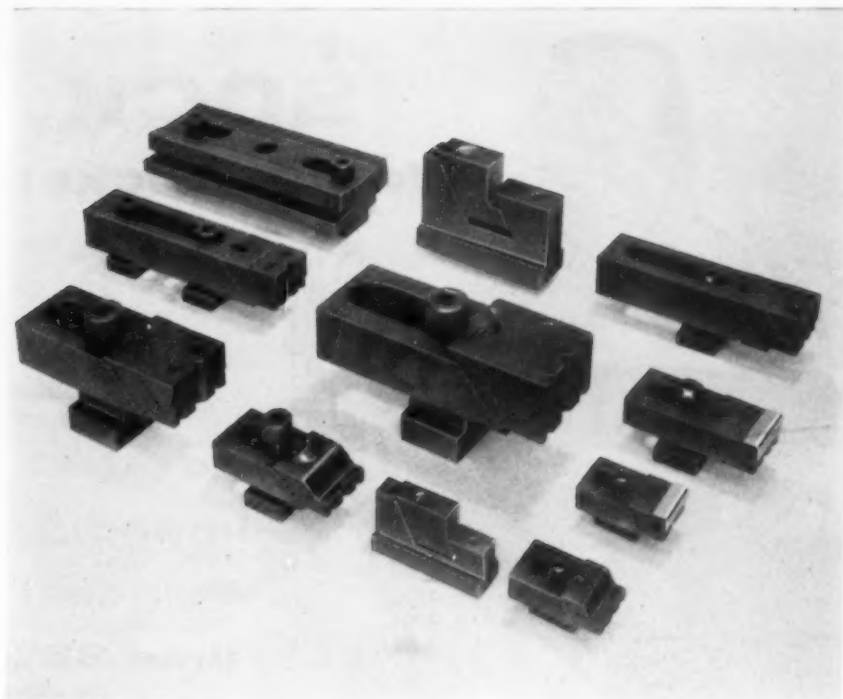
**4C POSTAGE WILL BE PAID BY—**

**modern**  
**machine**  
**shop**

**BOX 74**  
**VILLAGE STATION**  
**NEW YORK 14, NEW YORK**







Where you can get . . .

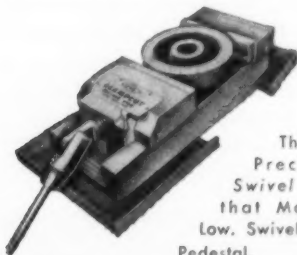
## DOWN-HOLDING DEVICES for any machine table or face plate

J & S All-Purpose Jaw Clamps eliminate U-Clamps, Straps and Fingers for lathes, planers, milling machines, boring millers, jig borers, etc.

Faster Set-up with any of the 5 Models of J & S Jaw Clamps—one adjusting screw has a holding force of  $2\frac{1}{2}$  tons on the Small Model, to 12 tons on Jumbo Model for positioning and holding the work-piece.

Single powerful clamping action obtained from the  $45^\circ$  angle inward and downward movement of the jaw clamp is easily applied and controlled.

Compact, efficient design of J & S Jaw Clamps eliminates the usual obstruction problems—no interference with measuring tool readings.



The only  
Precision  
Swivel Vise  
that Mounts  
Low. Swivels. No  
Pedestal.

See your industrial distributor or write today for free literature.



J & S TOOL CO., INC.

**CLAMPCUT**

871 DORSA AVE.  
LIVINGSTON, NEW JERSEY

For more data circle 232 on Reader Service Card





**SOCK**  
for the socket!

**New  
Rotor J-2L  
Impact  
Wrench  
cuts time 23%**



Formerly used electric nut setter for assembly of garden tools. Switch to Rotor J-2L Air-powered Impact Wrench cut job time 23%. Savings paid for tool in 12½ weeks.

New J-2L Impact Wrench is reversible . . . specially designed for minimum maintenance.

Find out how *you* can cut costs with the rugged, lightweight J-2L and other new Rotor Tools! Ask for Bulletin 41.

**THE ROTOR TOOL CO.**  
CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

For more data circle 233 on Reader Service Card



# You can have your **SNAP GAGE** as you want it -

FLAT, PLUNGER  
ANVILS

SMALL FLAT ANVILS

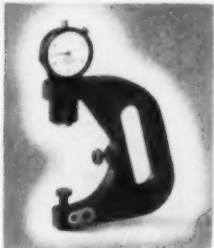


ROUND, SPRING  
ANVILS

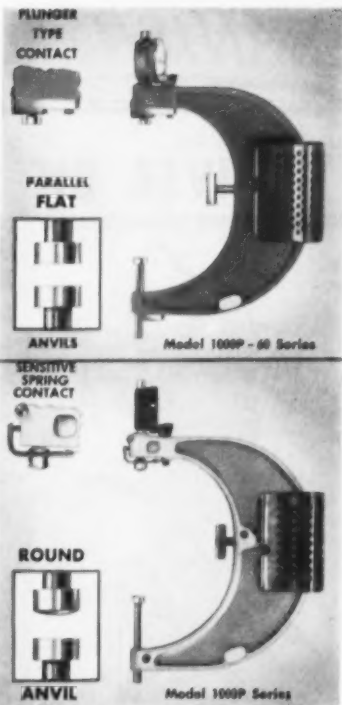
RETRACTING ANVIL



**RUGGED  
SPRING TYPE**



**RUGGED  
PLUNGER TYPE**



**We make  
Indicating Snap Gages  
to suit any whim or  
necessity**

These Gages are made to meet all the usual physical and accuracy needs of gage users. They can be had in a wide range of sizes and can be modified to suit particular needs. If you haven't seen just what you *must* have, ask us about what you want. We also make Air Snap Gages.

**FEDERAL PRODUCTS CORPORATION**  
51412 Eddy St. • Providence 1, Rhode Island

*Ask* **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic—for Inspecting, Measuring, or Automation Gaging

For more data circle 234 on Reader Service Card

December, 1955

modern machine shop 35



# **BANISH TOOLROOM INEFFICIENCY**

*with*

## **OLIVER DIE MAKING MACHINES**



In more than 10,000 installations throughout the world, OLIVER Die Makers have banished inefficiency in machine sawing, filing and lapping. Unsurpassed for nearly 40 years, OLIVERS have been found invaluable on such jobs as Production Filing, Experimental Work, Metal Patterns, Cams, Gages, Templates, etc.

OLIVERS simplify die making to the extent that expensive, hard-to-get skilled labor is not required . . . Coupled with this fact is their speed and accuracy . . . saving time and cutting costs up to 60%. And to top it all, OLIVER DIE MAKING MACHINES have such a long, dependable operating life that many have been kept in continuous use for more than 25 years.

### **OLIVER DIE MAKERS Available in 5 Models**

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

**Write Today for Complete Technical Data on  
OLIVER DIE MAKERS**

See our catalog in Sweet's Directory



### **MACHINE TOOLS by OLIVER include:**

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS  
DRILL POINT THINNERS  
TEMPLATE TOOL GRINDERS  
FACE MILL GRINDERS  
DIE MAKING MACHINES

# **OLIVER INSTRUMENT CO.**

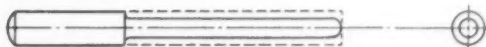
1430 E. MAUMEE • ADRIAN, MICHIGAN

For more data circle 235 on Reader Service Card

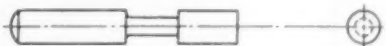




## Close Tolerances... without Machining



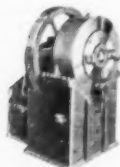
This finished piece used to be made on an automatic screw machine with the long, narrow diameter section turned to  $.100 \pm .003$  and a necessary sharp shoulder.



Torrington's swaging experts suggested starting with this simple screw machine blank (to retain the required shoulder).



Result after one rotary swage—an improved finished piece, to a tolerance of  $\pm .001$ .



THE TORRINGTON COMPANY  
Swager Department  
700 North Street, Torrington, Conn.  
Makers of Torrington Needle Bearings

Why not write for our informative booklet on swaging that includes complete descriptions of Torrington Rotary Swagers. It may show you how you can achieve a "swaging success story" in your own plant.

## See what savings you can make by swaging

1. Saving in material—swaging uses nearly all the metal.
2. Saving in time—swaging is fast.
3. Saving in labor—unskilled labor can run a swager.
4. Saving in machining—swaging produces finishes accurate to  $\pm .001$ .
5. Saving in finishing operations—swaging produces high finish, better hardness and resiliency.

# TORRINGTON ROTARY SWAGING MACHINES

For more data circle 236 on Reader Service Card



# Nothing Like It For "Big Grinder" Features AT LOW COST!

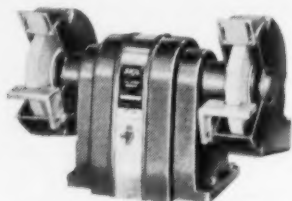


## Why SKIL Bench Grinders Are The Finest You Can Buy!

- More safety features at low price!
- Self-lubricating ball bearings!
- Fast-starting statically and dynamically balanced motor!
- Solid housing of pressure die cast aluminum!
- Pedestal base for extra convenience  
... Illuminated or plain eye shield  
—all optional at small extra cost.

## **SKIL** 6" BENCH GRINDER

Ordinarily you find features like these only on larger, more expensive bench grinders! Wheel guards with end covers, spark arrestors and exhaust chutes give *extra safety*. Flat face design permits easier handling, lets you reach hard-to-get-at surfaces. For grinding, sharpening, brushing, or buffing—in all production and maintenance.



Model 246, 1/4 h.p.—Only \$58.00

Model 247, 1/2 h.p.—Only \$68.00

*Write for a demonstration and FREE trial. See why SKIL Models 246 and 247 are the finest grinders of their size you can buy anywhere today!*

## **SKIL** PORTABLE TOOLS

Made only by SKIL Corporation  
formerly SKILSAW, Inc.

5033 Elston Avenue, Chicago 30, Illinois  
3601 Dundas Street West, Toronto 9, Ontario  
Factory Branches in ALL Leading Cities

For more data circle 237 on Reader Service Card



# stop!

## HIGH BENDING COSTS

Multiple bending on Pedrick Production Benders can materially cut costs on all bending operations for pipe tube or structural metal.

Prove it. Write us your particular problem. Let us supply the cost-cutting answer in terms of pennies per bend. PEDRICK TOOL AND MACHINE CO., Dept. 5, 3640 N. Lawrence St., Philadelphia 40, Pa.



FREE "PEDRICK LINE" BULLETIN.  
WRITE TODAY.

**PEDRICK**

production benders

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**SHELDON**  
CHICAGO U.S.A.

**NEW**

# Sebastian 13"

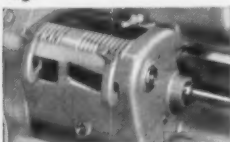
**A-5 GEARED HEAD  
PRECISION LATHE**



Speed changes easily made by revolving speed dial on headstock



Heavy, multiple Splined Spindle with "Zero Precision" tapered roller bearings



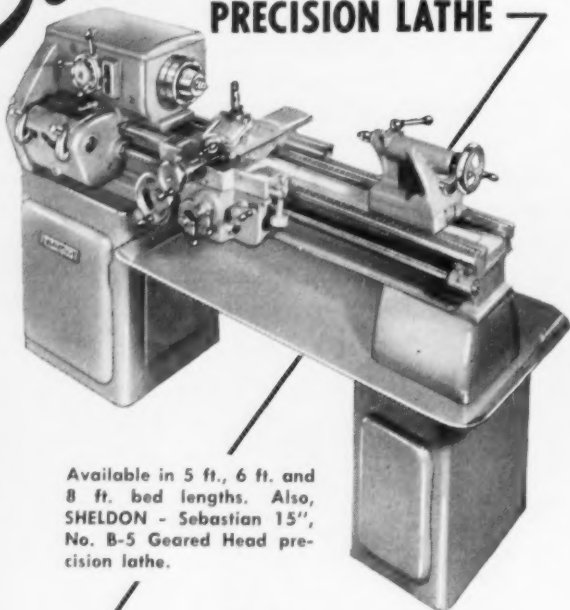
Quick change Gear box provides 60 different threads or feeds — has built-in lead screw reverse



Massive 1-piece, double walled apron with gears running in oil has "1-shot" pressure lubrication system for carriage and ways



Cam action tailstock clamp permits rapid release and instant locking of tailstock



Available in 5 ft., 6 ft. and 8 ft. bed lengths. Also, SHELDON - Sebastian 15", No. B-5 Geared Head precision lathe.

This is a completely new Sebastian Lathe designed and built by Sheldon . . . a rugged work horse with extra power, toolroom accuracy and all the modern features that make for money-saving production . . . with all controls centrally grouped in easy reach for safe efficient operation.

Modern, heavy cast-iron pedestal (included in base price of lathe) completely encloses motor and drive . . . with storage space in tailstock leg for tools and chucks.

Run this new Sebastian lathe. Test its performance. You will appreciate the powerful cuts that this lathe can take. Write for circulars on 13" and 15" Sebastian lathes and name of nearest dealer where you can see and operate these outstanding lathes.

## SHELDON MACHINE CO., INC.

4205 N. Knox Ave. • Chicago 41, Illinois

For more data circle 239 on Reader Service Card



do your operators have this

# Time Saver

to help cut machining costs  
on stub boring operations?



SET No. 11 ILLUSTRATED  
WEIGHT 350 POUNDS

- $1\frac{1}{4}$  to 8" Bore Range in 7 Tools
- Eliminate "cut and try" boring
- Precision adjustment to .0001"
- Reduce setup and tool changes

**10 DIFFERENT STANDARD SETS  
AND MANY MODIFICATIONS  
READILY AVAILABLE**



## **SUPER MICROMETER-ADJUSTABLE STUB BORING TOOL SETS**

Your operators always have the right tooling answer at their fingertips—for cutting costs and improving accuracy on non-repetitive boring—when you provide them with Davis Stub Boring Tool Sets. Then time lost at the tool crib is ended. For without once leaving their machines, they can bore from  $1\frac{1}{4}$  to 8 inches, pencil bore from  $\frac{3}{4}$  to  $1\frac{1}{4}$  inches and do light, extended boring up to 13 inches.

Highest precision and fine finish are assured by Davis Super Micrometer-Adjustable mechanisms used in all seven basic tools in each set. It provides a wide range of cutter adjustments to limits of .0001" by simply setting the micrometer screw's dial head at the desired reading. Exceptionally rugged construction makes Davis tool sets ideal for either rough or finish boring operations. Learn how this modern tooling idea can save money in your shop.

Write today for Davis Bulletin DB-50.

# DAVIS

**BORING TOOL DIVISION OF  
Giddings & Lewis Machine Tool Co.  
Fond du Lac, Wisconsin**





# JOB SHOPS

# TAKE NOTE!

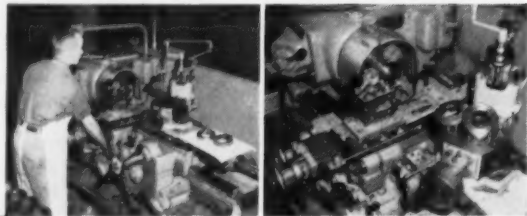
**303 Stainless Steel—  
All finishes held to 16 RMS or better**

**LEE ENGINEERING CO.,  
BALTIMORE,  
TOOK THIS ORDNANCE JOB  
ON SUB-CONTRACT.**

"Job shops" might well be called "tough-job shops". Specifications must be "on the nose", bids must be low, and still there must be a profit. It calls for smart management plus good equipment.

Consider this case. It was a tough job, but the winning bid was made with confidence. Lee *knew* that this job would be "duck soup" for their new J&L Ram Type Turret Lathe . . . All production commitments were met with ease — just another example of a "job shop" operation made *profitable* through the use of the versatile Jones & Lamson Universal Turret Lathe.

*The piece is machined in two operations on the same lathe without tooling changes.*



Send today for J&L's Machine Tool Replacement Information Kit (the low-down on tax depreciation, financing plans and machine tools).

## JONES & LAMSON



*Machine Tool Craftsmen  
Since 1835*

JONES & LAMSON MACHINE CO., 521 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

MACHINE TOOL DIV.

For more data circle 241 on Reader Service Card





Famco Air Presses at Bell & Howell Company, manufacturers of precision, photographic, optical and electronic equipment

## 3 famco air presses save Bell & Howell Company \$2,000 per year

Famco Air Presses have replaced the engraving of serial numbers on three of Bell & Howell's major camera lines. Collectively this change-over has saved approximately \$2,000 per year based on present production facilities and the Air Presses paid for themselves in approximately 6 months time. In addition to savings, Famco Air Presses performed with minimum maintenance and a perfect safety record.

Bell & Howell has been using Famco Machines for approximately 5 years and has about 150 machines—air presses, arbor presses, power presses. They are used for various types of bench assembly work—pressing pins into castings, pressing shafts into gears, staking and stamping serial numbers.

Your dealer can give you complete information on Famco Products, or you can write to Famco direct for FREE illustrated catalog.



### **famco machine company**

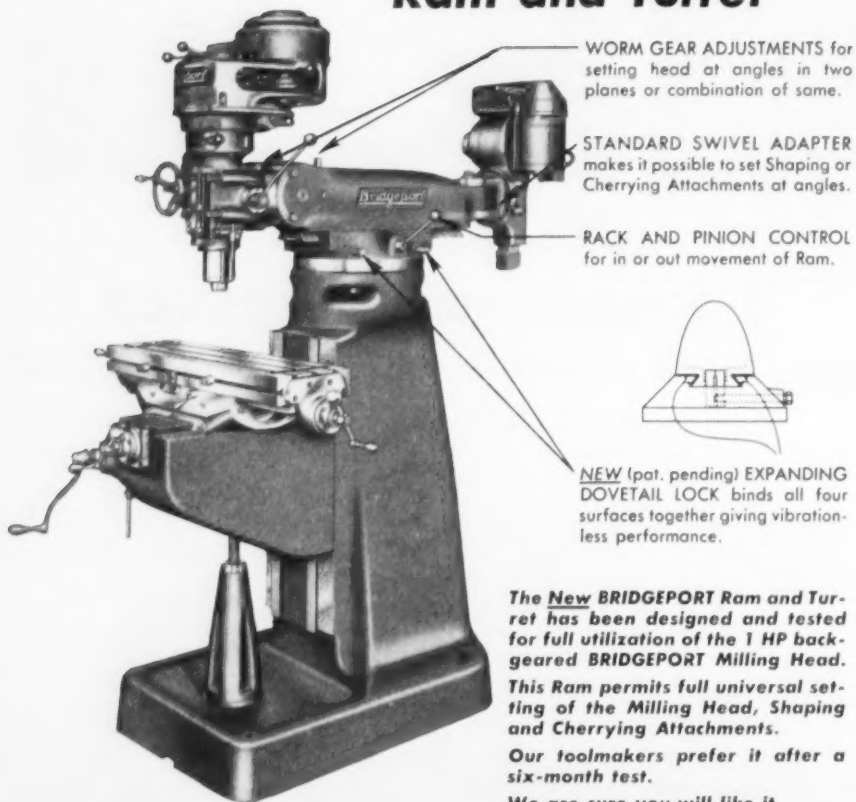
3122 SHERIDAN ROAD • KENOSHA 125, WISCONSIN  
Arbor Presses • Air Presses • Drill Presses • Band Saws  
Power Presses • Foot Presses • Squaring Shears

For more data circle 242 on Reader Service Card



# INVESTIGATE...

## the NEW Bridgeport Ram and Turret



The New BRIDGEPORT Ram and Turret has been designed and tested for full utilization of the 1 HP back-geared BRIDGEPORT Milling Head. This Ram permits full universal setting of the Milling Head, Shaping and Cherrying Attachments.

Our toolmakers prefer it after a six-month test.

We are sure you will like it.

**Bridgeport MACHINES, INC.**

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

For more data circle 243 on Reader Service Card



approved by U. S. industry • meet government specifications  
approved by world-wide industry

★

meet or exceed ASTE standards • ideal for production  
approved at sea • used by U. S. Navy and merchant marine  
approved for jet engine program

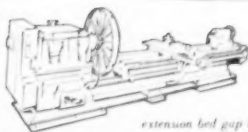
★

used in atomic energy projects  
excellent for maintenance

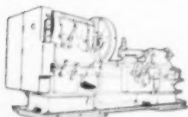


**NOW READY  
FOR ANY CHALLENGE!**

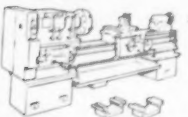
Nebel lathes are approved by every important industry, and for almost every government project. Continuously improved since 1899, they're ready for your assignment. Write for bulletin. The Nebel Machine Tool Co., Cincinnati 25, Ohio.



*extension bed gap lathes*



*engine lathes*



*removable black gap lathes*



**Nebel**  
**LATHES**

CINCINNATI

*workhorse of the metal-  
working shop since 1899*

For more data circle 244 on Reader Service Card





I've been making tools for wire and ribbon metal forms long enough to know that A. H. Nilson Fourslides are the most adaptable and produce parts most economically. For easy set-up and tool adjustment, accurate feed, and rugged design . . . Nilson Fourslides are my choice.

Look at the part shown on the left . . . made in our Nilson #S-O Fourslide. Better than 5,000 of these are produced per hour automatically from coiled stock using .039 dia. tin-plated copper wire, and this tops any previous production method.

I'd suggest you contact Nilson yourself and learn how you can increase production and lower costs with Nilson automatic Fourslides.



Actual Size



**A.H.**  
**NILSON**  
**MACHINE COMPANY**

1514 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines : Staple Forming Machines : Wire and Stock Reels : Wire Straightening Equipment : Slide Feeds for Presses

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# NEW

## design freedom

FEATURED IN THE EXPANDED DANDLY DIE SET LINE



### NOW Dandy meets or beats all ASA standards . . .

with the world's broadest die set line. There's no need for compromise between the standard set you want and the set you can get, less need for costly specials. The new line of Dandy Standard Die Sets has die space and guide post dimensions that equal, or exceed, ASA specifications. Under the new standards, front to back die space is measured from edge of bushing to front of die set.

In addition to offering a complete selection of ASA standard die sets, Dandy provides the Dandy Standards proved popular over the years . . . all available from stock at your nearest Dandy Branch. You can be sure of meeting all your die set needs at Dandy . . . either ASA standard or Dandy Standard.

### NOW Dandy offers you these additional features:



**Oil Lubrication System For Shoulder Bushing Sets.** This new Dandy die set feature assures longer life, easier maintenance, proper lubrication even during long runs.



**All Horizontal Surfaces Ground On New Dandy Die Sets.** Horizontal surfaces, including top of punch holder and bottom of die holder, are ground to the same exacting precision as the inner die set surfaces.



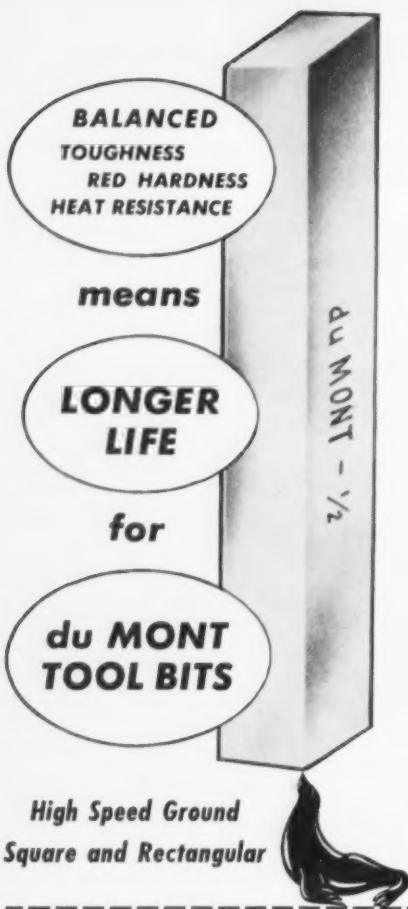
**Integral Welded Shanks.** 100% weld on all steel sets regularly furnished with shanks gives greater strength and rigidity. Deep counterbores in punch holder have less tendency to weaken set.



DIE SETS AND  
DIEMAKERS' SUPPLIES

**DANDLY MACHINE SPECIALTIES, INC.**  
2100 South Laramie Avenue, Chicago 50, Illinois





**High Speed Ground  
Square and Rectangular**

**The duMONT CORPORATION  
Greenfield, Massachusetts**

MAIL FREE Tool Bit COMPARISON  
CHART, CATALOG and PRICE LIST  
S to

Name .....

Company .....

Address .....

See Them at BOOTH 406—PLANT  
MAINTENANCE SHOW—Philadelphia

For more data circle 247 on Reader Service Card

## Meetings

### Important Meeting Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**December 5-9** • 25th Exposition of Chemical Industries, Commercial Museum and Convention Hall, Philadelphia. Information: E. K. Stevens, Manager, International Exposition Co., 480 Lexington Ave., New York 17, New York.

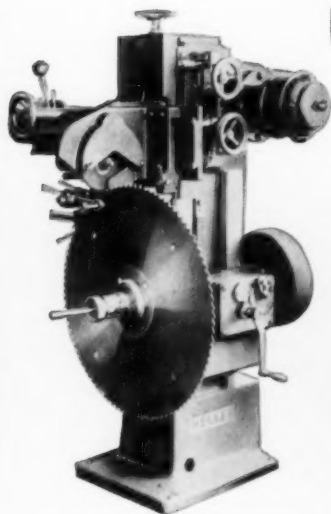
**December 10-16** • Nuclear Congress and Atomic Exposition, Public Auditorium, Cleveland, Ohio. Information: International Atomic Exposition, 931 Book Bldg., Detroit 26, Michigan.

**January 23-26** • Plant Maintenance and Engineering Show, Convention Hall, Philadelphia. Information: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

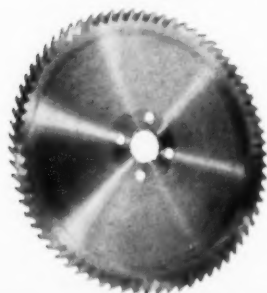
**March 15-16** • Steel Founders' Society of America, Annual Meeting, Drake Hotel, Chicago. Society headquarters: 606 Terminal Tower Bldg., Cleveland 13, Ohio.

**March 19-23** • American Society of Tool Engineers, Annual Meeting and Industrial Exposition, International Amphitheatre, Chicago. Society headquarters: 10700 Puritan Ave., Detroit 38, Michigan.

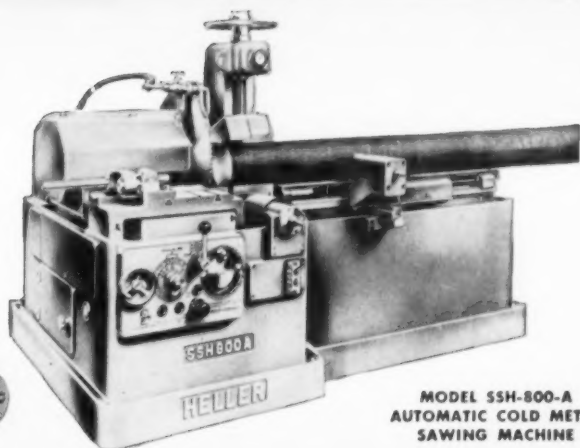




MODEL B-650  
AUTOMATIC SAW SHARPENING  
MACHINE



HELLER GIVES YOU COMPLETE SERVICE  
WITH EXACTLY CORRECT BLADES.



MODEL SSH-800-A  
AUTOMATIC COLD METAL  
SAWING MACHINE

**CENTRALIZED  
RESPONSIBILITY**  
*assures*  
**TRIPLE ECONOMY**  
*with* **HELLER**

- 1. The Cold Sawing Machine**
- 2. The Blade Sharpener**
- 3. The Circular Sawblade**

Economies are effected on every operation involved in cold metal sawing by taking advantage of the complete service available through Heller.

The specific savings offered by use of the combination of Heller Cold Metal Saws, Heller Blade Sharpeners and recommended Sawblades becomes accumulative when used with each other.

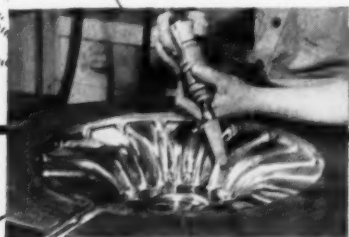
**HELLER MACHINE COMPANY, 114 Liberty St., New York 6, N. Y.**

**KNEE AND PLANNER TYPE MILLING MACHINES • RADIAL AND COLUMN  
DRILLING MACHINES • TRANSFER MACHINES • SPECIAL MACHINES**





Tool and Die Work



## YOUR "TOUCH OF GOLD" ROAD MAP TO HARD-TO-REACH GRINDING SPOTS

**NORTON MOUNTED WHEELS AND POINTS**  
*bring you big savings on hundreds of small grinding jobs*

Norton mounted wheels and points bring the same "Touch of Gold" grinding performance to small or hard-to-get-at areas that the big Norton wheels deliver in the "wide open spaces." Here are some reasons why:

*They stay **TIGHT** on their spindles, under severest use. Norton developed mounting techniques make sure of this.*

*They're trued on their own spindles, which assures: (1) perfect concentricity; (2) sharpness and fast-cutting action; (3) accuracy of dimensions and shape. They're ready for work immediately.*

*They're duplicated identically from lot to lot, thanks to Norton's statistical quality control.*

*They're made in nearly 200 standard shapes and sizes . . . in **ALUNDUM**\*, **CRYSTOLON**\* and diamond abrasives . . . in all required bonds . . . and in the reinforced BF construction. For ultra-high speed precision grinding, special spindles and cement are available.*

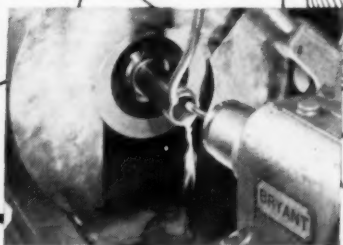
### See Your Norton Distributor

for the mounted wheels and points you need. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Expert:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

\*T.M. Reg. U. S. Pat. Off. and Foreign Countries

W-1649





Internal Grinding  
A Tapered Hole



Finishing Die  
On Profile Grinder



Snagging  
A Casting



Touching Up A Die



Finishing Up A Punch

to Chamfering, Polishing, Spot Grinding, Breaking Corners,  
Removing Tool Marks, Smoothing Welds, Etc.

**NORTON**

*Making better products...  
to make your products better*

and its BEHR-MANNING division

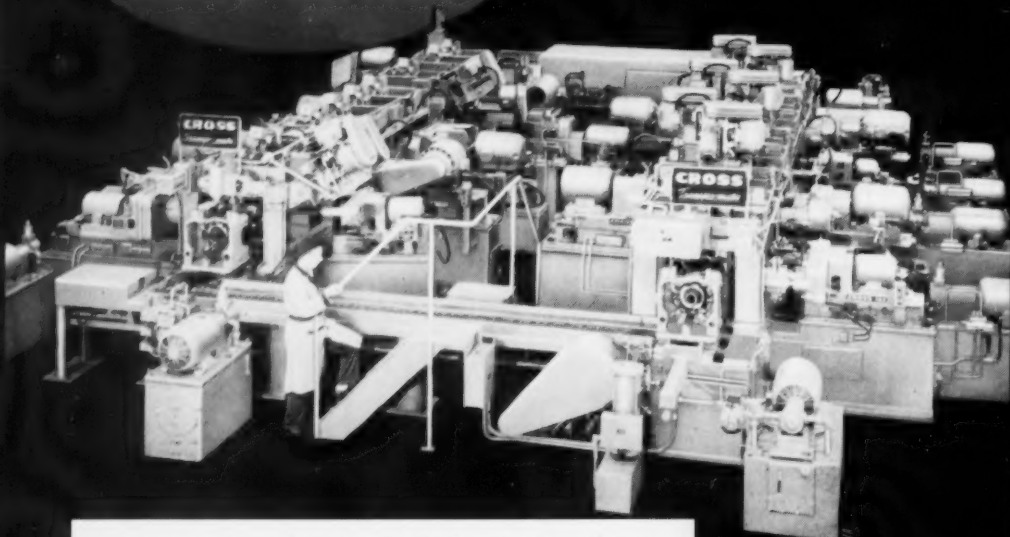
NORTON COMPANY: Abrasives • Grinding Wheels • Grinding Machines • Refractories  
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

For more data circle 250 on Reader Service Card

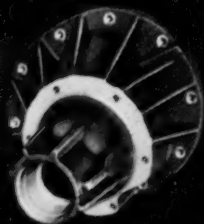
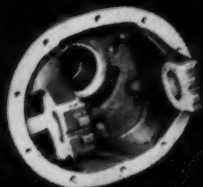


# Mills, Drills, Bores, Turns Differential Gear Carriers

*Another Transfer-matic by Cross*



- ★ Rough and semi-finish bores pinion bores and cross bores; rough and finish faces and turns pilot diameter of torque tube flange; mills faces of cross bore bosses; spotfaces flange mounting holes; drills, chamfers, reams and taps all other holes except flange holes.
- ★ 115 pieces per hour at 100% efficiency.
- ★ 73 operations: 8 milling, 8 boring, 2 crossfacing, 1 turning, 18 drilling, 10 spotfacing, 7 chamfering, 2 reaming, 9 tapping, 8 probing.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Palletized work holding fixtures with hydraulically operated torque wrenches for clamping and unclamping parts.
- ★ Washing and drying unit for cleaning fixtures between last cutting station and loading station.
- ★ Other features: Construction to J.I.C. standards; hardened and ground ways; hydraulic feed and rapid traverse; automatic lubrication system.



Established 1898

THE **CROSS** CO.  
DETROIT 7, MICHIGAN  
*Special* MACHINE TOOLS



# modern machine shop

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**modern machine shop**  
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EVERY TIME with  
ROOFE Heavy Duty  
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Two double rows of quality bearings in the large and small ends of the nose of this live center are your assurance of perfect alignment on any type of work.

Two shank sizes provide diameters from 1/2" to 7 1/2" for a wide range of work with a single center.

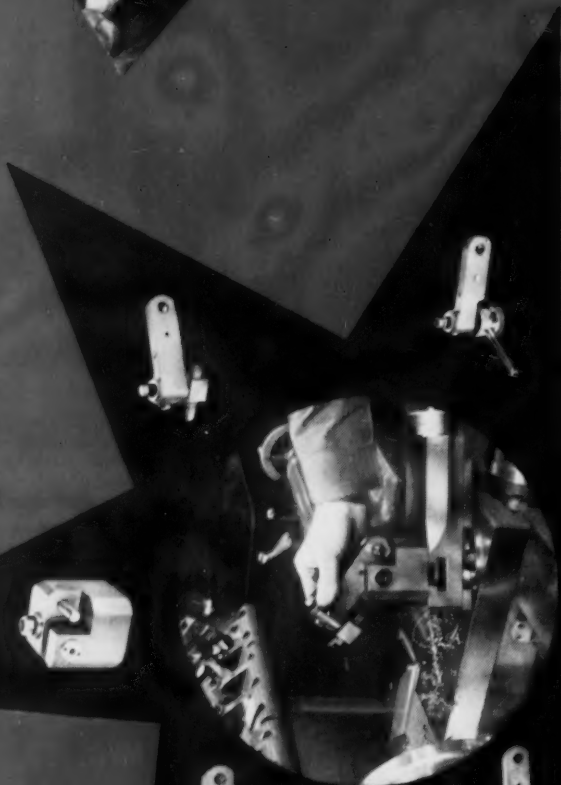
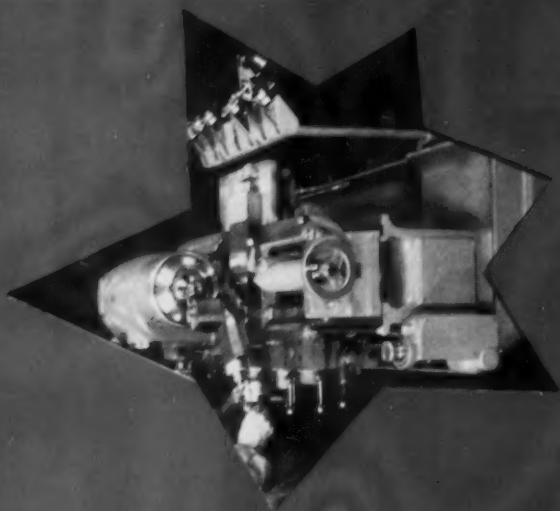
Write now for complete catalog of all types of ROOFE Live Centers.

**HOUSTON GRINDING  
and MFG. CO.**

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*Click - and you've made a tool change !*



## Pre-Ground, Pre-Calibrated Monarch *Quik-Tool* Ready-Set Tooling Provides Immediate Tool Change

Tool block fits any standard Monarch 10" Model EE Toolmaker's or Manufacturing Lathe compound rest "T" slot. Tools can be used in any combination or sequence for turning, boring, facing, chamfering, grooving, necking, threading, knurling, or cut-off. The tools automatically position themselves.



FOR A GOOD TURN FASTER... TURN TO MONARCH

What's Quik-Tool? It's a tool block and set of seven tool holders, all precision ground and pre-calibrated to provide better accuracy of positioning and response than you get from any turret.

And it's fast! Tools automatically position themselves when slipped onto a locating pin and swung into the slot of the tool block. They don't even have to be aligned or clamped into position, as the precision fit of tool holder and tool block insures rigidity and accuracy.

Monarch Quik-Tools are specifically valuable in the toolroom or instrument shop for practically any type of turning, with tools used in any desired combination or sequence. The standard tool setups can be used, without adjustment to tool settings, for a wide variety of jobs. Holders are designed for standard tools and gages.

How about it? Don't you want to know *all* about how Monarch Quik-Tool eliminates lengthy setups and cuts tool change time to seconds? Send for our complete illustrated booklet today . . . . **The Monarch Machine Tool Company, Sidney, Ohio.**

**Fill Out This Coupon and Clip to  
Your Business Letterhead, Please  
THE MONARCH MACHINE TOOL CO.,  
SIDNEY, OHIO**

Please Send Me Your Illustrated Quik-Tool  
Booklet #306.

NAME \_\_\_\_\_

TITLE \_\_\_\_\_



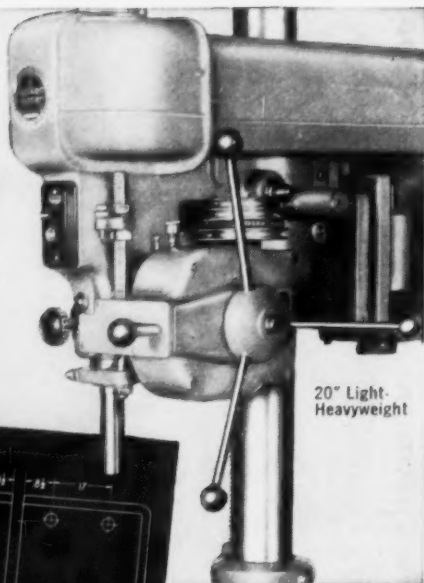
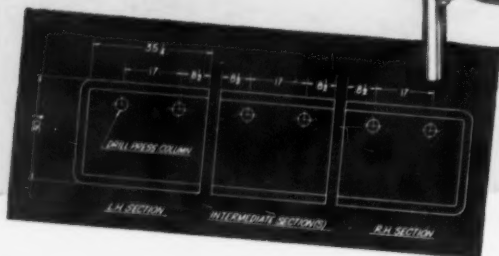
**THIS**



**COMBINATION**

*cuts costs!*

Standard  
Table  
Sections



Add as many spindles as you want—and multiply your savings—with this combination designed for economical production drilling. You will note, as indicated by the drawing and photos, that you may combine *any number of Table Sections* to accommodate just the right number of 20" LIGHT-HEAVYWEIGHT Drill Press Spindles to fit the specific jobs you have to do.

This LIGHT-HEAVYWEIGHT combination gives you the maximum in flexibility and economy. The number of

intermediate Table Sections determines the number of Spindles which can be varied to fit the nature of your work and output requirements. Best of all, you avoid the heavy expenditure for costly, specialized equipment.

Ask your Distributor to demonstrate the performance advantages of Walker-Turner LIGHT-HEAVYWEIGHT 20" Drill Press units. He has them in stock as Bench Models and Floor Models, and can specify Multi-spindle Models with exactly the number of drill heads you need.



**Walker-Turner LIGHT-HEAVYWEIGHT**  
20" Multi-spindle Drill Press  
(Six Table Sections—12 Drilling Units)

## WALKER-TURNER

• DIVISION •  
KEARNEY AND TRECKER CORPORATION  
PLAINFIELD, N. J.

DRILL PRESSES—Hand and Power Feed • RADIAL  
DRILLS • Wood and Metal Cutting BAND SAWS •  
TILTING ARBOR SAWS • RADIAL SAWS • JIG SAWS •  
LATHES • SPINDLE SHAPERS • JOINTERS • BELT  
AND DISC SURFACERS • FLEXIBLE SHAFT MACHINES

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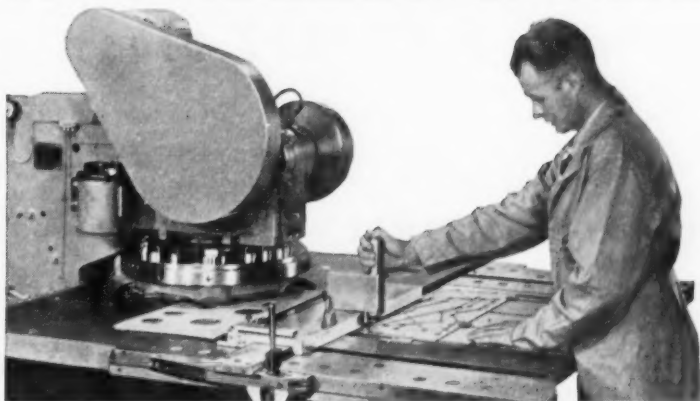


*for High Speed • Low Cost Piercing of*

# **CHASSIS and PANELS**

**IN LOW TO MEDIUM QUANTITIES**

**the RA-41P  
WIEDEMANN**



## **TURRET PUNCH PRESS**

The RA-41P WIEDEMANN economically pierces chassis  
and panels in small to medium lots for:

**COLOR TV  
RADAR  
FIRE CONTROL**

**COMMUNICATIONS  
BUSINESS MACHINES  
AIRCRAFT**

*and many other applications*

*Write for Bulletin 241*

## **WIEDEMANN MACHINE COMPANY**

4219 Wissahickon Ave., P.O. Box 6794, Philadelphia 32, Pa.

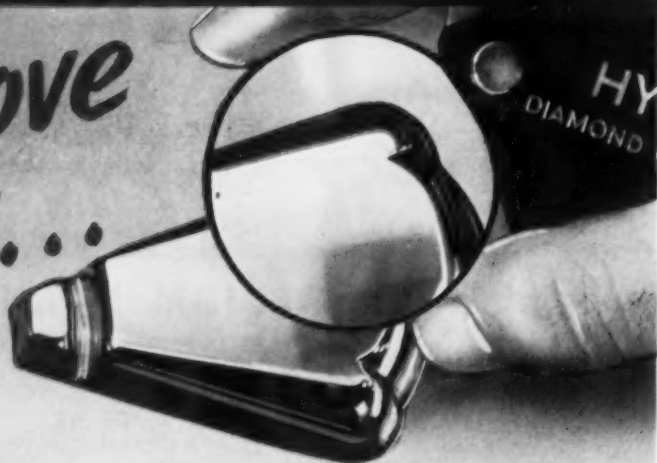
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December, 1955

modern machine shop 57



*Prove  
it...*



**with a HYPREZ glass**

An experienced eye will critically check the finish on your dies, molds, tools or gages—but a Hyprez magnifying glass will definitely confirm

**THE SUPERIORITY OF...  
HYPREZ**



The Hyprez Magnifying Glass will be sent upon request on a company letterhead. Kindly enclose 25c to cover packing and postage. Write Dept. S-125.

**DIAMOND COMPOUNDS**

For all finishing jobs, from roughing to mirror polish, Hyprez, the original high precision diamond compounds, have world-wide acceptance.

Their superior quality and results are due to strict laboratory controls; exactly graded diamond particles with free-cutting action; the exclusive Hyprez vehicle that maintains uniform, permanent dispersion.

Available in 18- and 5-gram sealed cartridges for use with the Hyprez Applicator Gun.

**HYPREZ DIVISION**

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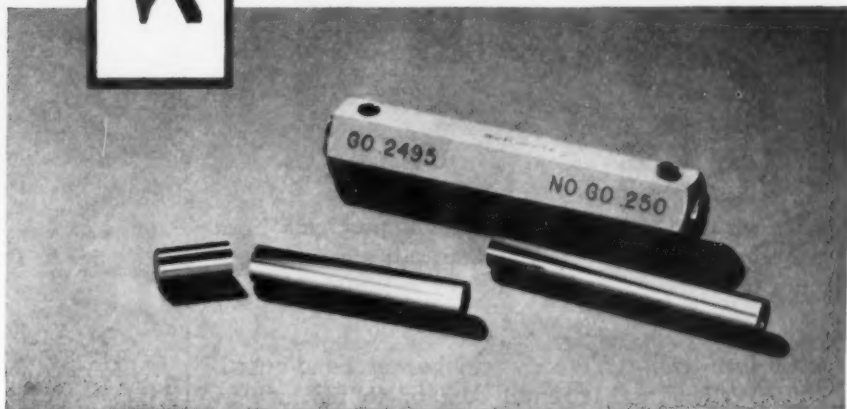
431 S. Dearborn St., Chicago 5, Ill.

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## WIRE TYPE PLUG GAGES



**VASTLY LONGER-LIVED and Money Savers . . .**  
**because they're "Cut-off-Able" as well as "Reversible"**

As a Van Keuren agent put it, "They're not only reversible, they're cut-off-able". And that means when you buy Van Keuren Wire Type Plug Gages, the sizes below  $\frac{1}{8}$ " may be cut off when ends become worn and as many as from five to ten gages made available from the  $1\frac{1}{4}$ " and 2" long units. It is not only economical and practical to use Van Keuren Gages but it is a very simple operation to cut off the ends by following instructions furnished on request. The illustration above shows clearly the cut-off and reversible features.

VK Wire Type Gages are available in ZZ to XXX accuracies in sizes from .001" to 1.000". They are furnished in alloy tool steel, high speed steel, chromium plate or tungsten carbide. Whatever the gaging job, the extra length provided in VK units will save you money. It will also pay you to take advantage of VK deliveries. In many cases we can ship your requirements from stock.

VK Wire Type Plug Gages are fully described in Catalog & Hand Book No. 36, available on request.

Send for a copy of the new, 258-page Van Keuren Catalog and Handbook No. 36 containing valuable technical and engineering information on measuring problems and methods. Address:



36th YEAR

THE *Van Keuren* CO.,

175 WALTHAM STREET, WATERTOWN, MASS.

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . .  
Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master  
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# Tough grinding jobs?

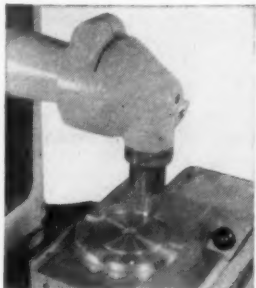
Check **Vulcanaire**  
high speed precision  
grinding heads!



Grinding circular slot using Vulcan's Rotary Table and Magnetic chuck.

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table for Surface Grinders permits the grinding of a circular slot.

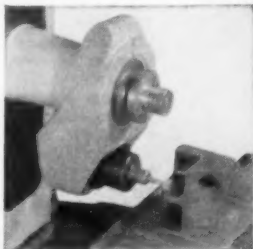


Vertical adaptor for Surface Grinders. Grinding small slots

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.



Horizontal application Grinding a Shoulder Punch.

*Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.*

## Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO.

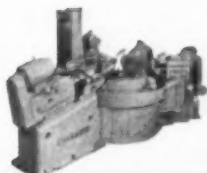
710 LORAIN, DAYTON, OHIO



**MODERN** builds  
for  
**MACHINING  
METHODS**

**Special Machines**

like this 5-way machine for  
drilling and tapping jet  
engine compressor housings.



**MODERN** builds  
for  
**POROSITY  
CHECKING**

**Pressure Testing**

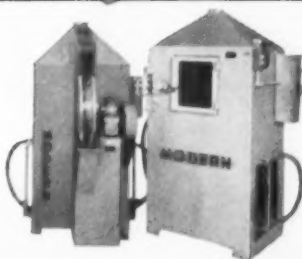
equipment like these models  
which check exhaust mani-  
folds for leaks. They also  
locate the leak for salvage.



**MODERN** builds  
for  
**DEBURRING**

**Maizo Blast**

deburbing machines like  
these for the production burr-  
ing of "soft" metal parts.



and only  
**MODERN** builds the  
*Burr-Masters*  
for

**GEAR DEBURRING AND CHAMFERING**

Shown here is the model BME-14 Universal Burr-Master. It  
chamfers and deburrs the teeth of spur and helical gears as  
well as external straight or involute form splines. Universal  
Burr-Masters are available to handle pitch diameters from  
3/8" to 24"



**MODERN**

*Industrial Engineering Co.*

14230 BIRWOOD AVE. DETROIT 38, MICHIGAN

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December, 1955

modern machine shop 61



MORE PROFIT WITH...

# SIoux

## PORTABLE SANDERS



and

# SIoux

ABRASIVE DISCS

Years of leadership in design, engineering, and quality manufacture, has won for Sioux Portable Sanders the finest reputation for cost-cutting speed, efficiency, and unsurpassed endurance. There's a Sioux Sander to meet each requirement.

**THEY GO AROUND TOGETHER!**

SIoux Resin Bond Abrasive Discs are made with tempered aluminum oxide grain for maximum action. They are tough and flexible. Cutting action is not affected by grinding heat. There is a type for each need, including Industrial Abrasives for heavy work, Regular for body work on light gauge metal, and Open Coat for paint removal and cool grinding. Call your Sioux Distributor.



USE SIoux ALL THE WAY THROUGH  
STANDARD THE WORLD OVER...  
**ALBERTSON & CO., INC.**

SIoux CITY, IOWA, U.S.A.

ELECTRIC IMPACT WRENCHES • GRINDERS • FLEXIBLE SHAFTS • POLISHERS • DRILLS  
HAND SAWS • SANDERS • VALVE FACE GRINDING MACHINES • ABRASIVE DISCS

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Now See the Entire Collection of  
**"Award-Winning"**  
**Kling Metal Fabricating**  
**Machines in this**  
**New Bulletin 100**



In the new Kling Bulletin you will find illustrations and data representing over 50 Kling Machines. These versatile machines, performing scores of metal-working operations, are winning "Production Oscars" for thousands of companies throughout the world. It is the increased production . . . labor-saving . . . cost-cutting results from Kling machines that account for their increasing use in "the best of companies." We will be glad to send you a list of users in your industry, along with your free copy of the new Complete Line Bulletin 100. Why not send for it today?

Since 1892

**Kling**

**BROS. ENGINEERING WORKS**

1329 N. KOSTNER AVE. • CHICAGO 91, ILLINOIS

Makers of Friction Saws; Shears—Rotary, Double Angle and Guillotine; Punches; Combination Shear, Punch and Coper; Angle and Plate Bending Rolls; Bulldozers.

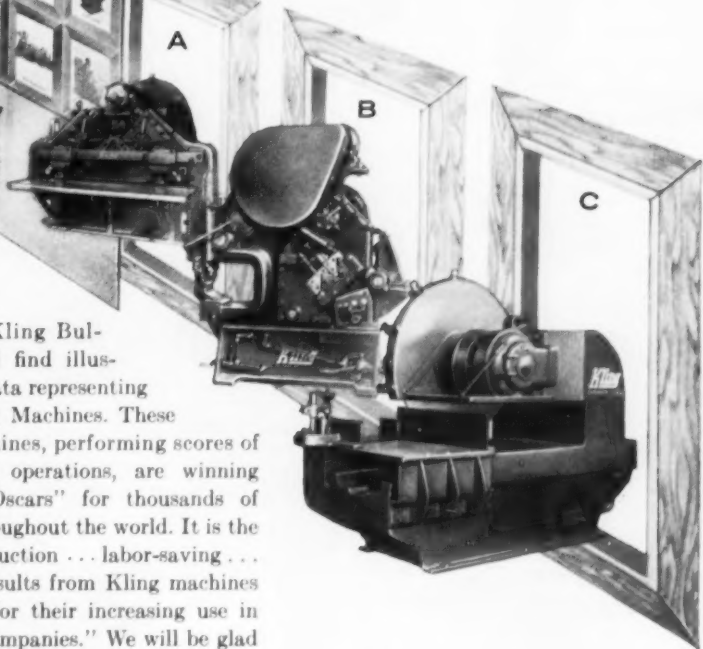
Export Distributor: Simmons Machine Tool Corp.  
 50 E. 42nd Street, New York 17, N. Y.

997MT

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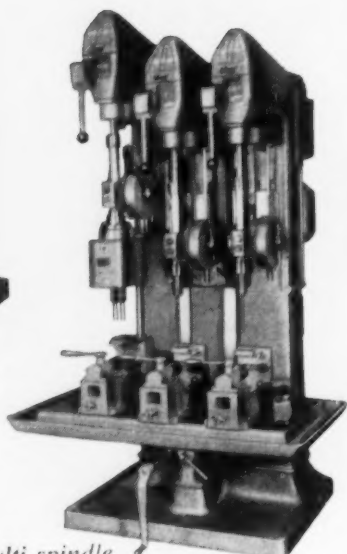
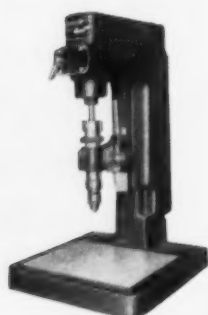
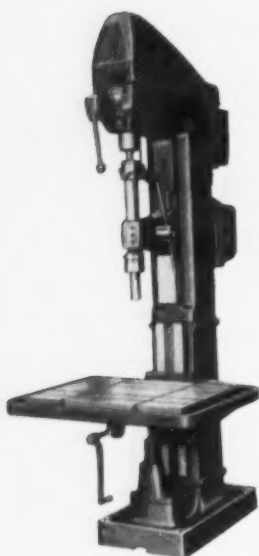
December, 1955

modern machine shop 63



- A KLING DOUBLE ANGLE SHEARS**
- B COMBINATION SHEAR, PUNCH & COPERS**
- C HIGH SPEED FRICTION SAWS**

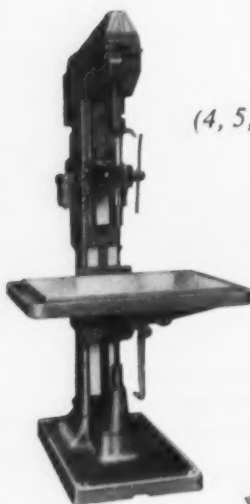




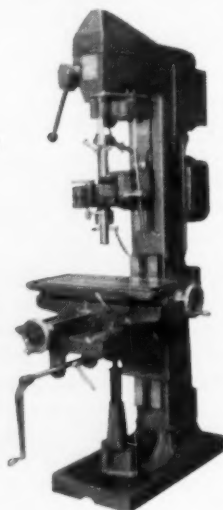
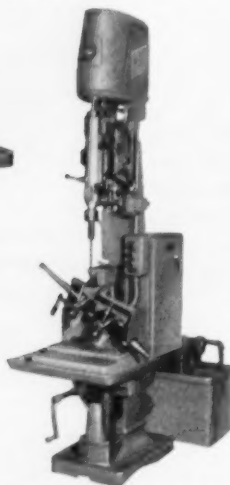
(1) Bench type

(2) Column type

(3) Multi-spindle



(4, 5, 6) Tool room drills



For more data circle 263 on Reader Service Card





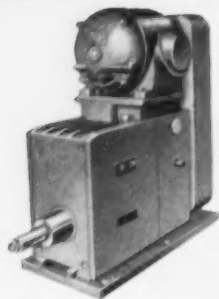
Whatever your light and medium duty drilling needs, it's a sure bet that the machine you need is made by Avey. The whole Avey line would pack this magazine with pictures—would give you every combination of size, capacity, speed, overhang, and table arrangement to fit your requirements. The ones shown will give you the general idea. Write for literature.

## Avey has the right one

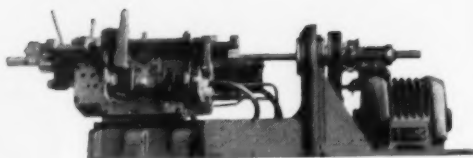
*(Figures 1 through 6) Standard Drilling and Tapping Machines.* Capacities in cast iron from very small numbered drills to 1½"; 6 or 8 speeds up to 12,000 rpm; No. 32 Jacobs chuck to No. 4 Morse taper; 4 feeds; 1 to 6 spindles; column or bench type; wide range of swing. Featuring such "bonus" advances as micrometer stop collar; telescoping spindle guard; dynamically balanced rotating parts; rack and pinion operated motor plate; large tool and die shop tables; and Avey's pace-setting spindle construction.

*(4, 5, and 6) Avey tool room drills, built in No. 2 and No. 3 BMA-6 sizes. Large table 34" x 25"; round table 18" diameter; compound table 25" x 12".*

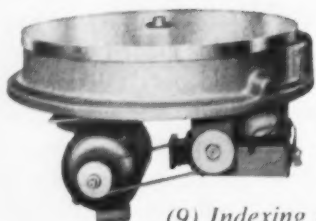




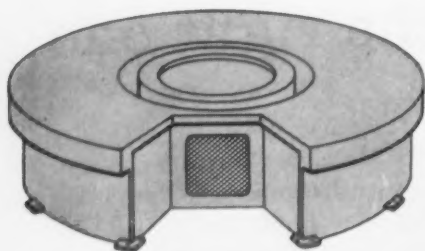
(7) Cam feed unit



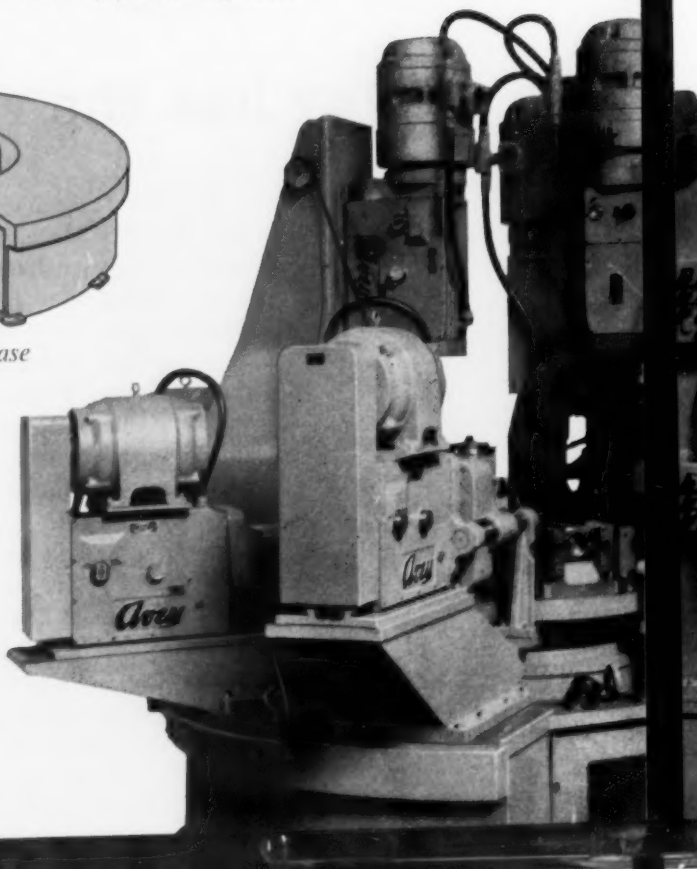
(8) Avey-draulic



(9) Indexing table



(10) Standard base





The Avey logo is a stylized, cursive script of the word "Avey" in white, set against a dark, horizontally-oriented oval background.

**drilling, tapping, production machines**

(7) *Automatic Cam Feed Units.* For drilling, tapping, reaming, hollow milling. Vee belt or gear drive. Nos. 1, 2, and 3 Morse taper. Capacity in cast iron: No. 1, 1/2"; No. 2, 1". Mount at any angle. Fully or semi-automatic. Self-contained, tamper-proof.

**for Avey makes them all**

(8) *Avey-draulic feed unit.* Automatic withdrawal for chip removal only when necessary during deep hole drilling. Rapid advance, feed, and rapid return. Jump feed attachment available. Standard strokes 12" up to 30". Avey's patented Torque-matic control optional.

(9) *Automatic index tables.* Rapid, accurate indexing to .001". Even or uneven index patterns obtainable. 16" to 48" diameter. All adaptable to Avey standard bases.

(10) *Steel Bases.* One of Avey's standard line of fabricated bases. Stress relieved, sand-blasted, machined, and painted to fit your application. Combine 7, 8, 9, and 10, and you get fast returns on your investment, and a step ahead of your competition!

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

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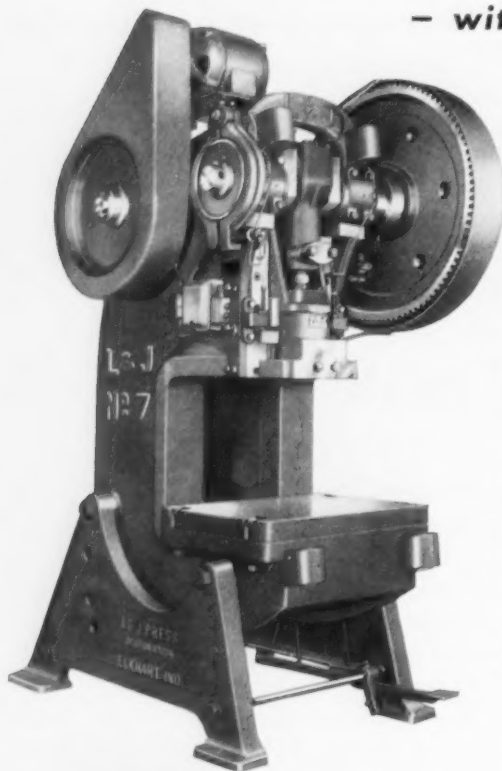


# NEW L&J NO. 7 PRESS

**RIGID — ACCURATE — EFFICIENT**

**— with a LARGER**

**WORK AREA**



This new press will give you greater production at lower cost. Its alloy iron frame has exceptional rigidity which holds deflection to a minimum and gives closer tolerances, greater uniformity and longer die life. Accuracy is also obtained through adjustable gibs of extra length. The rugged ram adjusting screw has buttress threads and replaceable hard bronze seat. Air clutch optional. Geared and non-geared models.

**Specifications:** capacity 75 tons, standard stroke 4", strokes per minute 42 (non-geared 85), die space 14" to 22".

**Write for Catalog**

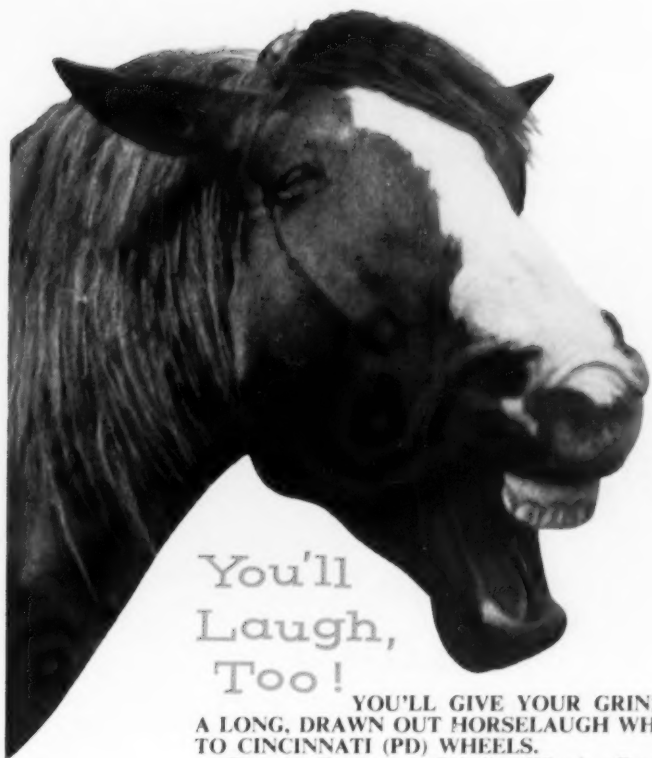
**21 O.B.I. models — 8 to 90 tons**



**L&J PRESS CORPORATION**  
**1624 STERLING AVE., ELKHART, INDIANA**

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You'll  
Laugh,  
Too!

**YOU'LL GIVE YOUR GRINDING PROBLEMS  
A LONG, DRAWN OUT HORSELAUGH WHEN YOU SWITCH  
TO CINCINNATI (PD) WHEELS.**

For *now* CINCINNATI Grinding Wheels offer **POSITIVE DUPLICATION**—a remarkable achievement in precision manufacturing and quality control that *can save you money . . . and increase your production.*

And you'll keep right on smiling with pleasure every day that CINCINNATI (PD) WHEELS are on the job. Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every time* you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

*Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.* So, doesn't it make good horse sense to get full details on CINCINNATI (PD) WHEELS right away?

Just contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . .



**POSITIVE DUPLICATION**

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

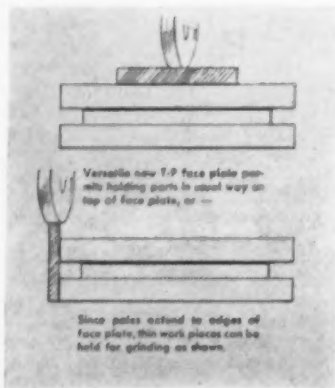
**CINCINNATI**  
*Grinding Wheels*

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## New Face Plate on Taft-Peirce Permanent Magnet Chucks



### Increases Capacity Simplifies Setups

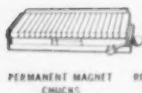
Now lower, longer, and stronger T-P Superpower Permanent Magnet Chucks offer you more surface plate area to work with. Poles extend to edges of face plate to eliminate waste space and dead spots.

15 to 20% lower in height than other Permanent Magnet Chucks, these Superpower Chucks give you more clearance between wheel and chuck.

Since poles extend the full width of face plate, sides of chuck can be used for grinding edges of thin sections. Simplifies complicated setups.

In addition, a Superpower P-M Chuck has more magnetic poles for its size — gives you a greater effective working length.

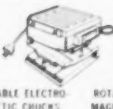
Extra-sturdy construction assures maximum dependability, minimum maintenance. Now available in a range of standard sizes. Also in sine angle chuck models. Specials on request. Write for more information.



PERMANENT MAGNET CHUCKS



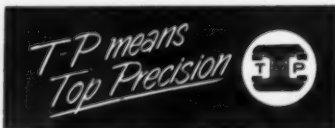
RECTANGULAR ELECTRO-MAGNETIC CHUCKS



ADJUSTABLE ELECTRO-MAGNETIC CHUCKS



ROTARY ELECTRO-MAGNETIC CHUCKS



THE TAFT-PEIRCE MANUFACTURING COMPANY, WOONSOCKET, RHODE ISLAND

For more data circle 269 on Reader Service Card





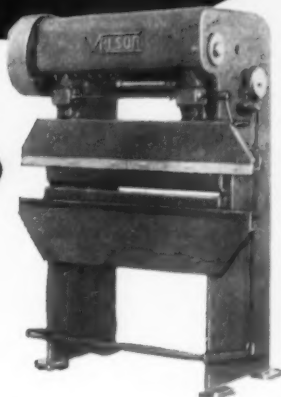
**IMMEDIATE  
DELIVERY FROM STOCK**  
**16-48 Press Brake \$1,455**

**1062 Press Brake \$2,190**



1062

16-48

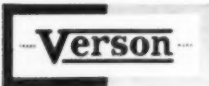


Verson standard press brakes, Model 16-48 with 16 ga. by 48" capacity priced at \$1,455.00\* and Model 1062 with 16 ga. by 78" capacity priced at \$2,190.00\*, are immediately available from stock! There are no involved proposals, no long waits . . . it's as simple, quick and convenient as ordering from the corner grocer . . . Verson standard press brakes right "off the shelf."

Write for complete spec sheets on either model. Then just place your order.

\*FOB Chicago, less dies

A Verson Press for every job from 60 tons up.



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

**VERSON ALLSTEEL PRESS CO.**

9310 S. Kenwood Avenue, Chicago 19, Illinois  
So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES  
TOOLING • DIE CUSHIONS • Verson-WHEELON HYDRAULIC PRESSES

For more data circle 270 on Reader Service Card

December, 1955

modern machine shop 71

**New, Improved,  
Fully Enclosed  
VERSON  
SHEET FLOATERS**

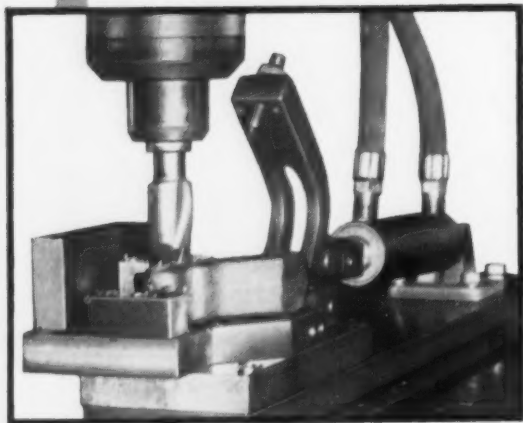
Easiest, most economical way to separate steel sheets and blanks. Available in 3 models, each with 7 sizes. Write for descriptive literature and prices.



# LODDING

**pioneers a new era  
in work-holding**

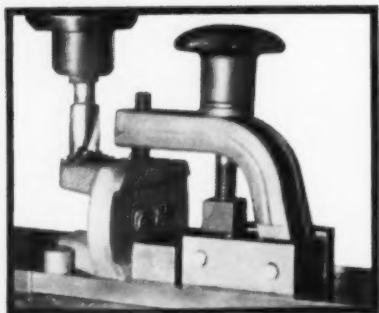
## RETRACTING CLAMPS



### Air Automation

As fast as air, as rigid  
as a bar of forged steel.  
Lodding's new Retracting  
Clamp is self-retracting and  
adaptable to all work.  
Four sizes, four types.

For rapid hand clamping,  
too. Quick as a flick of the  
wrist, a quarter turn of the  
screw, and a natural arm  
movement brings clamp to  
work and clamps — another  
quick movement releases  
work and retracts clamp.



*Available with hand knob, cam or nut.*

## LODDING, Inc.

WORCESTER 1, MASS.

For more data circle 271 on Reader Service Card



# THE NEW WAY TO MARK EQUIPMENT...

with

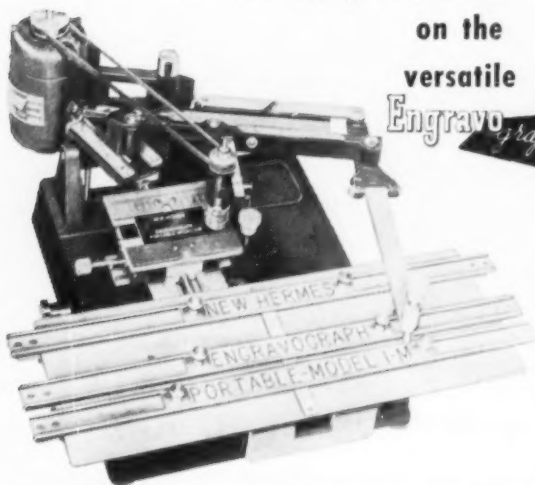
**GRAVO**

*flex*

the first chip-proof, flexible engraving stock

on the  
versatile

Engravo*graph*



So simple to engrave Gravoflex. Lettering will stand out permanently on contrasting background. No paint needed.

10,000 Engravographs in use for engraving on metals and plastics. Only the Engravograph has these patented features:

- Adjustable for 15 ratios. • Self-centering holding vise.
- Automatic depth regulator. • Adjustable copy holders.

Send for booklets

Engravograph Booklet IM-27 • Gravoflex Booklet G-27

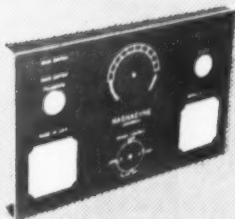
**NEW HERMES ENGRAVING MACHINE CORP.**

13-19 UNIVERSITY PLACE, NEW YORK 3, N. Y.

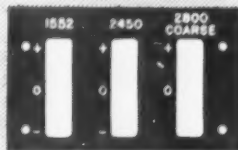
shear it



bend it



form it

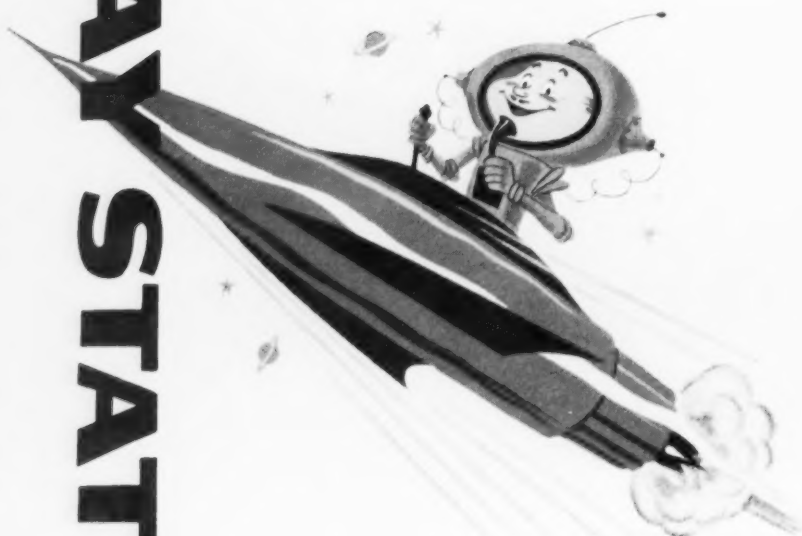


punch it

For more data circle 272 on Reader Service Card



# BAY STATE TAPS



## WHEREVER YOU ARE

... when you need Bay State Precision Performance

Taps, call your *Industrial Supply Distributor*.

He'll deliver them with supersonic speed

to keep your production high ... and he'll stock

the sizes you need to keep your inventory and

tapping costs low. BAY STATE TAP & DIE COMPANY



MANSFIELD, MASSACHUSETTS

For more data circle 273 on Reader Service Card



## Another NEW PRATT & WHITNEY DEVELOPMENT

### THE NO. 2E VERTICAL PRECISION HOLE GRINDER



- **EXTREMELY ACCURATE** . . . Incorporates famous P&W Electrolimit Measuring System. Table settings accurate to .0001". Grinds straight or tapered holes and radii with extreme precision for size and location.
- **HIGH GRINDING SPEEDS** . . . Pneumatic grinding heads with unique air bearings provide speeds to 100,000 rpm. Governor maintains speed settings regardless of load changes.
- **VERSATILE** . . . Grinds holes up to 10" dia.; 22" x 44" table with P&W open-side construction easily accommodates large or odd-shaped work.
- **DURABLE-DEPENDABLE** . . . All slide ways protected by telescoping guards. Entire machine designed and built to minimize wear and retain original high accuracy and rigidity year after year.

Write for 2E circular No. 589



## PRATT & WHITNEY COMPANY

INCORPORATED

25 Charter Oak Blvd., West Hartford 1, Connecticut

Direct Factory Representatives in Principal Cities

MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 274 on Reader Service Card

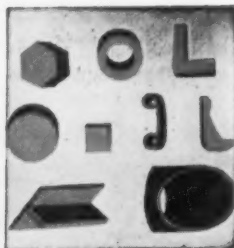
December, 1955

modern machine shop 75





THE CINCINNATI  
Wet Abrasive  
Cut-Off Machine



## *Cut Down* ON **CUT-OFF TIME!**

Cut any metal, solids or tubing fast and accurately! Capacity up to 2 1/4" in solids, 3 1/2" in tubing. Straight or angle cuts up to 45°. And look at these speeds: 2" bar stock in 15 seconds . . . 2" tubing, 3/32" wall, in 10 seconds . . . 2" angle iron, 1/8" thick, 45° angle, in eight seconds. Special features include Cincinnati's exclusive water nozzle, insuring proper coolant flow for longer wheel life; and foot-operated vise, freeing operator's hands for faster production.

Write today for Bulletin 55-RA

MFRS. OF DRILLS, GRINDERS, BUFFERS AND PORTABLE TOOLS

TRADE *The Cincinnati* MARK

**THE CINCINNATI ELECTRICAL TOOL CO.**

Division of THE R. K. LeBLOND MACHINE TOOL CO.

**CINCINNATI 8, OHIO, U. S. A.**

For more data circle 275 on Reader Service Card



A NEW KIND OF END MILL

JOINS THE BROAD ILLINITE LINE



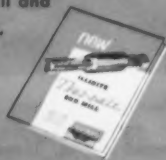
## Tri-Mil<sup>\*</sup> END MILL

**a versatile end mill with a complete  
range of flute lengths... in a single tool!**

Here's a new end mill with cutting edges running its entire length...  
having a productive life as long as its length! The advanced  
adapter design permits gripping at any position on the mill and  
can be located closer to work surface for greater rigidity.

Tri-Mil is a combination of four conventional end mills: stub length, regular length,  
long and extra long. It's the perfect cutting tool for every slotting operation.

Ask your Illinite distributor for this Tri-Mil brochure.



Tri-Mil and all famous Illinite End Mills are available  
in a full range of types and sizes from your local  
ILLINITE END MILL DISTRIBUTOR. Call him today!



ILLINITE OFFERS THE MOST COMPLETE LINE OF END MILLS

# ILLINOIS

**TOOL WORKS**

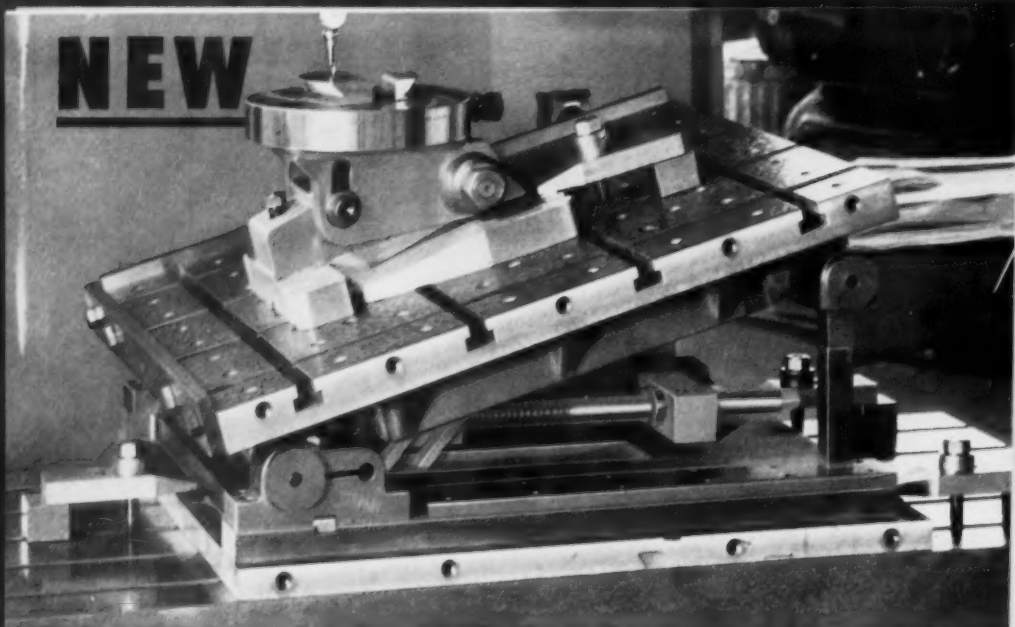
2501 N. Keeler Avenue  
Chicago 39, Illinois



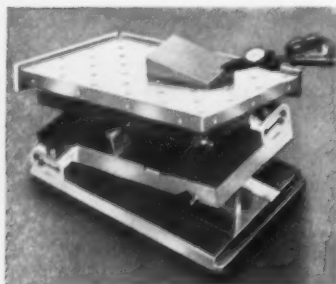
<sup>\*</sup> TRADE MARK



# **NEW**



## *Robbins* **SINE PLATE** **WITH 24" x 24" WORKING AREA**



Smaller Sine Plates are also available in models for both single and compound angles. Thousands are in daily use. Full details are in our illustrated catalog. Send for your free copy.

Designed on the sine bar principle, this husky new addition to the Robbins Sine Plate family provides gauge-block accuracy to angular set ups for very large, bulky work pieces. Any angle is quickly and accurately set up by inserting the correct standard gauge blocks between the top plate and the base of the unit.

In addition to the sturdy construction of these units, and to eliminate any possibility of dimensional inaccuracies due to distortion, gauge blocks are inserted at each side of the Sine Plate. Top plate is raised and lowered by a simple screw-type mechanism . . . positioning is simple, safe, sure.

Two of these Sine Plates used in combination also answer the need for any compound angle.

Complete information on these new extra-large Sine Plates or models built to specifications will gladly be forwarded upon your request.

**OMER E. *Robbins* COMPANY**

**24800 PLYMOUTH ROAD • DEPT. B-4 • DETROIT 39, MICH.**

*Also producers of special gauges and fixtures*



## Talking About Die Sets



WITH  
PHIL MARSILIUS  
Vice-President  
The Producto Machine Co.

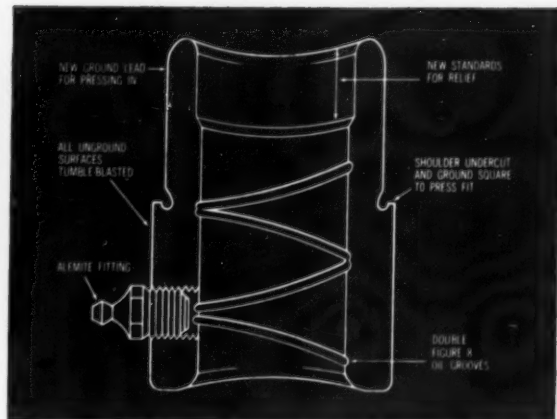
**Lubricate for Longer Life.** Faulty or insufficient lubrication of guide pins and bushings can result in a rapid reduction in the accuracy of die operation. Since the relationship between wear and friction is a direct ratio, proper lubrication greatly reduces wear and increases the useful life of pins and bushings. There are many fields of thought as to the type of lubricant best suited to die set operations at different speeds and varied accuracy requirements. The type used depends on the experience of the press-room foreman. The method of application also varies widely to suit individual needs.

**Standard lubrication methods** involve a simple oil groove in the bushing. Here are a few inexpensive systems using the guide pin bushing as a source of lubrication: 1. Relief in the top of bushing is loaded with oil or grease; 2. Oil caps that feed oil into either a circular or Figure 8 groove in bushing through a hole in bushing wall; 3. An oil or grease fitting through which lubricant is forced manually as the need arises; 4. An oil reservoir cup that fits snugly over pin and from which oil is dipped onto bushing with each stroke of the press and is drawn up to completely coat bearing surface of pin for next downward stroke; 5. A steel oil-retaining ring containing a felt washer that fits over pin and slides up and down by spring-loading action or is attached to bushing.

**Guide pins** also have been made with oil grooves around the circumference or with splines or slots along the length, fed from inside through small connecting holes. Here, of course, bearing surface is somewhat reduced and pins tend to pick up dirt or chips.

**Another method** minimizes the amount of lubrication required. Bushings are made of bronze or other "soft" materials which hold lubricant in their surface while at the same time reducing friction normally encountered with like metal contact.

**Whatever method you choose**, proper lubrication will add life to your die sets and help maintain die accuracy.



Cutaway drawing of new Producto bushing

## NEW PRODUCTO BUSHINGS IMPROVE DIE SET ACCURACY, APPEARANCE AT NO EXTRA COST



Producto has engineered five important new design features into its master bushings\*—the heart of the die set—which provide greatly improved accuracy and appearance at no additional cost to users:

1. NEW STANDARDS FOR RELIEF give greater bearing surfaces, improve accuracy.
2. GROUND SHOULDERS seat bushings square to punch holder, guaranteeing perfect alignment.
3. NEW GROUND LEAD ON PRESS FIT starts bushing into punch holder easily.
4. DOUBLE FIGURE 8 OIL GROOVES fed by grease fitting provide a con-

stant source of lubrication to pin and bushing. (Optional spring-loaded grease cups are available.) 5. TUMBLE-BLASTING OF ALL UNGROUND SURFACES polishes surfaces in areas normally not finished after hardening.

These innovations are typical of the steps being taken to keep Producto's die set quality abreast of its service.

If you would like to receive *Die Set Digest*, our new, fact-filled quarterly, just drop us a note. And remember, for precision die sets fast, call your nearest Producto branch.

\*"Popular size" master die sets already have these new bushings. They will soon be available on all sizes.

THE PRODUCTO MACHINE COMPANY  
910 Housatonic Avenue, Bridgeport 1, Connecticut  
Telephone FOrest 7-8675

**For prompt die set service, phone these PRODUCTO assembly warehouses:**

Atlanta	CY 7667	Detroit	LI 6-7600	Philadelphia	MO 4-1010
Chicago	ES 8-3307	Kansas City	BA 9033	Rochester	GL 1810
Cleveland	SU 1-6158	Los Angeles	TR 9826	St. Louis	FR 3370
Dayton	MU 1651	New York	WO 4-7484	or check the Yellow Pages in	

any stamping center in the United States or Canada for distributors stocking PRODUCTO.

**Produce More With**

# PRODUCTO

**Precision Die Sets**



For more data circle 278 on Reader Service Card



# New Fosdick Layout Machine does

*The new Fosdick Radial Layout Machine combines a high-precision jig borer table with our sensitive radial drill.*

## **Table gives cross movement.**

Vee and flat construction with precision screw in center of vee insures easy, precise movement through full 18" of travel. Graduated dial shows thousandths. A scale is included for rough measurements. Rapid traverse is available.

## **Head is traversed for length movement.**

Roller bearings support weight of head on hardened steel ways. Total length of travel, 34". Measurements are made by graduated dial on traverse bracket. Head rapid traverse is also available.

## **Vertical adjustment of table by power.**

Vertical adjustment, 16½". Maximum distance from spindle to table top, 23".

## **Other features**

One-piece column construction, 12" diameter. Fixed-height arm swings 360° around column. Arm and column clamps hold accurate position while drilling. Direct-reading feed and speed selecting levers. Safety feed clutch. 3 hp motor. Nine spindle speeds, 60 to 1200 rpm or 175 to 3500 rpm. Four spindle feeds, .004" to .020" or .002" to .010" per revolution.

# Use it also as a Radial Drill!

Simply remove the filler block between end of arm and outboard support and your Layout Machine becomes a Radial Drill! Work can then be mounted on the adjustable table and position reached by swinging arm and moving head. To drill large work pieces *entire* outboard support can be easily removed.



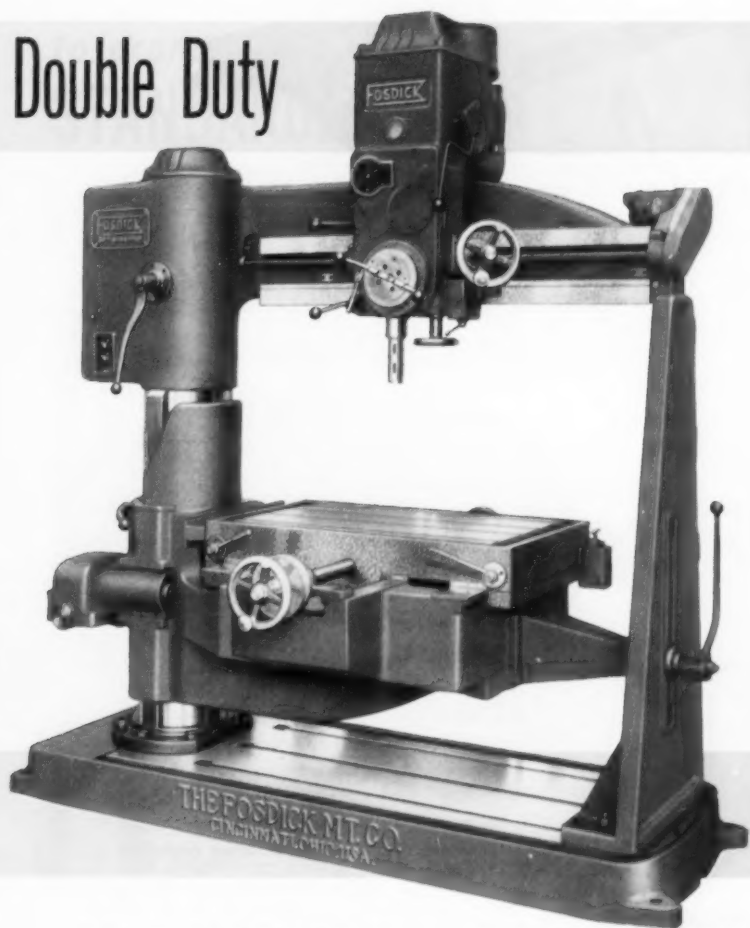
Formatic  
Radial  
Drills



Jig  
Borers



# Double Duty



Ask your Fosdick Distributor or write for Bulletin RLMS-12.

*Need Drilling Equipment? Get a Proposal from Fosdick!*



Sensitive and Upright Drills



Sensitive Radial Drills



Jig Grinders



Automatic Positioning Jig Borers

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

# FOSDICK

For more data circle 280 on Reader Service Card

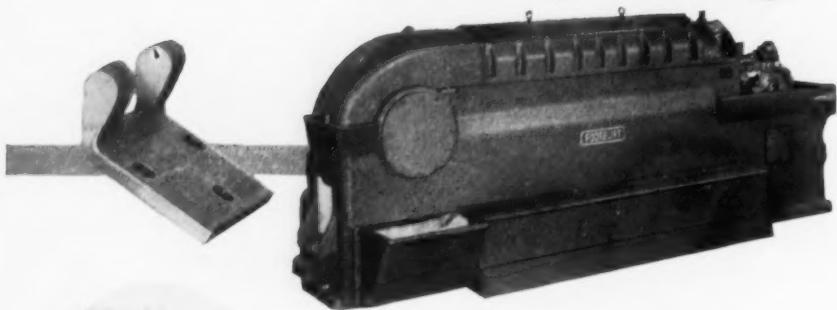
December, 1955

modern machine shop 81





*Lower Cost* per piece with  
*Surface Broaching*  
 of small parts



■ Holding fixtures are designed for quick, convenient loading, with automatic clamping and unclamping

■ In many plants where large quantities of duplicate metal parts are being machined, substantial savings are being made through the adoption of surface broaching. Production is exceptionally high, close tolerances are maintained, and tool maintenance costs are much lower than with ordinary methods. Foote-Burt engineers, pioneers in this advanced machining method, have had a wide experience in applying surface broaching in many fields.

**THE FOOTE-BURT COMPANY**

Cleveland 8, Ohio

Detroit Office: General Motors Building

*\* engineered  
 for  
 production*

**FOOTBURT**

**PIONEERS IN SURFACE BROACHING**

For more data circle 281 on Reader Service Card



*to economize*  
**STANDARDIZE**  
*with*

# RING



## precision PUNCHES and DIES



Ring Standardized Punches and Dies offer cost saving dependable performance for all of your perforating problems. Precision volume production to rigid specifications offers

- ★ Low cost
- ★ Complete interchangeability
- ★ Immediate shipments from stock on Standards plus prompt delivery on Specials
- ★ High quality — long life

### MANY SHAPES AND TYPES



ROUND



SQUARE



OBLONG



HEXAGON



RECTANGULAR

Blanks — Pilots — Headless — Shoulder and Bevel Head Quills — Slug Ejector Punches — Transfer Punches

**NEW!**

Tough — Accurate Retainers for Ring Punches and Dies mount easily to your die set. Available in Key Type for irregular shapes.

WRITE FOR OUR ILLUSTRATED CATALOG



# RING PUNCH & DIE COMPANY

19 FENTON PLACE

JAMESTOWN, N. Y.

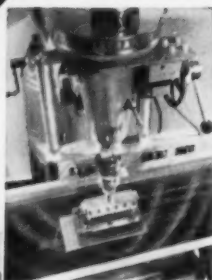
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**E**lectrical  
**D**ischarge  
**M**achining  
produced  
this multiple  
cavity in

**8** hours

conventional  
machining  
time  
**40**  
hours



Multiple Cavity in coolant retainer tank of Vertical Mill. Machined automatically without operator attention or broach cost.



Finished die and brass electrode. Die Material:  
Hi Chrome Die Steel. Tolerances:  $\pm .0005$  —  $.000$   
Finish: 15-20 micro inch.

Our engineering staff is always ready to help solve your specific machining problems. Representatives in your area will arrange appointments, at your request, for grinding, die sinking and cavity forming operations at EDM Demonstration Centers.

**DEMONSTRATION CENTERS:**

Plant—Clawson, Mich.

45 Broad Ave., Palisades Park, N.J.

1907 W. Monterey, Chicago, Ill.

\*T.M. Reg.

**elox** corporation of michigan

739 N. ROCHESTER RD. • CLAWSON, MICH.

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## YOUR **VICTOR** DISTRIBUTOR

can meet all your  
metal cutting  
needs

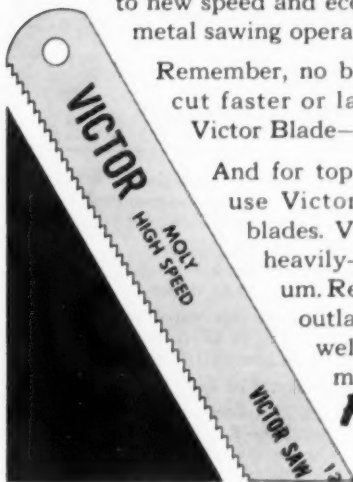
Whatever your particular cutting operations, there are Victor Hand and Power Hacksaws, Metal and Wood Cutting Band Saws and Hacksaw Frames to meet your specific requirements.

Every Victor distributor can give you prompt delivery of any metal cutting saw you want. His men are backed up by Victor factory experts who can show you the way to new speed and economy on production metal sawing operations.

Remember, no blade on the market will cut faster or last longer than the right Victor Blade—at the price you want!

And for top performance at a low price, use Victor "Moly"<sup>®</sup> High Speed Steel blades. Victor developed this high speed, heavily-alloyed steel blade of molybdenum. Remember, "Moly" High Speed blades outlast standard steel blades 10 to 1, cut as well as the best high speed steel blades made, but are substantially lower in cost.

**Free!** Ask your Industrial Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts.



Sold Only Through Recognized Distributors

# VICTOR

1889

VICTOR SAW WORKS, INC., MIDDLETOWN, N.Y., U.S.A.

MAKERS OF HAND AND POWER HACKSAW BLADES, FRAMES, AND METAL AND WOOD CUTTING BAND SAW BLADES.

For more data circle 284 on Reader Service Card

December, 1955

modern machine shop 85





## ways to cut costs of drilling and tapping

The H&F turret drilling machine, with preset depths, speeds and reversals—all attention-free during successive operating cycles—offers dramatic savings in:

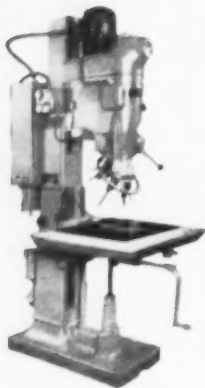
- |                   |                        |
|-------------------|------------------------|
| 1. Handling time. | 4. Maintenance.        |
| 2. Set-up time.   | 5. Capital investment. |
| 3. Tooling.       | 6. Floor space.        |

H&F Time Study #10 proves this versatile machine cuts handling time from 24% to 67%, assuming conditions most favorable to competitive equipment. Write for H&F Time Study #10 and new bulletins.



H&F's time saving turret attachment is separately available for attachment to standard drill presses . . . preset depth, speeds and reversals not included.

29 FITCH STREET, EAST NORWALK, CONN.



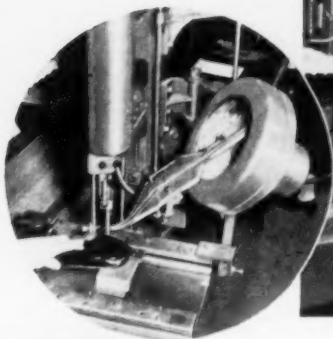
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**PRODUCTION  
COST**

*Cut 2/3*

*You Can Make a Similar Saving  
in Your Assembly Department!*



**DPS POWER  
SCREWDRIVERS**

assembling  
automobile  
arm rests

● These two machines maintain a production rate in excess of that previously attained by six hand operations, effecting an immediate saving of 66⅔%. This versatile equipment, used in prominent plants everywhere, can be adapted to your individual needs—So, get more action in your Assembly Department now—more speed—more profit. Write us, give details and our trained engineers will work out the proper solution of your problem.

**DETROIT POWER SCREWDRIVER CO.**

2807 W. FORT ST.

DETROIT 16, MICH.

For more data circle 286 on Reader Service Card

December, 1955

modern machine shop 87



# Have You Tried a NORBIDE® Dressing Stick?



Just a couple of passes  
with a NORBIDE Dressing  
Stick . . . that's all it takes to . . .

Clean up a wheel face



A NORBIDE Dressing Stick of Boron Carbide — the hardest man-made material — will outlast hundreds of ordinary dressing sticks.

With this light, handy stick you can see more of the wheel and thus avoid costly over-dressing. You'll find it will greatly reduce dressing dust nuisance also.

Order a supply of these cost-cutting sticks from your local Norton distributor, or write for Form 1567 giving more details.

Form a radius or groove



Touch up a cup or saucer



NORTON COMPANY, 49 New Bond Street, Worcester 6, Mass.



*Next to the diamond in hardness —  
available at a fraction of diamond cost*

For more data circle 287 on Reader Service Card





ask your  
**Bunting**  
distributor...



DISTRIBUTOR

**TRY HIM FIRST**

Your Bunting Distributor carries in stock completely machined and finished Bunting Standard Stock Industrial Bearings, Electric Motor Bearings and Precision Bronze Bars in a complete range of sizes, meeting all your usual production and maintenance needs. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, Bronze or Bearings, Bronze. He is an industrial distributor or a specialist in certain industrial items. Ask him for the Bunting Catalog or write.

**the most versatile  
bronze bearing**

Once upon a time all Bunting Standard Stock Bearings were "special" bearings—made to order. They originally cost many times what you pay your local Bunting Distributor today for those you may need for machinery maintenance. A Bunting Standard Stock Bearing will fit literally countless applications. It is the quick low-cost, satisfactory solution to almost any bearing problem.

**Bunting**®

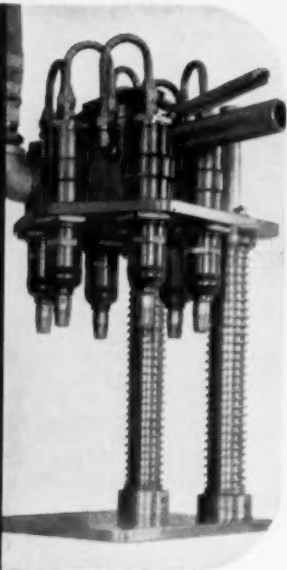
BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

**THE BUNTING BRASS AND BRONZE COMPANY**  
TOLEDO 1, OHIO  
BRANCHES IN PRINCIPAL CITIES

For more data circle 288 on Reader Service Card



**BUCKEYE** multiple-unit  
fastening and drilling tools  
reduce assembly time and  
costs on any operation  
involving two or more fasteners.



Now—an entire assembly operation, where two or more fasteners are used, can be completed in the same time required to drive a single fastener. The savings you can make will increase directly with the number of tools in your Buckeye multiple-unit tool. You decide how many screws or nuts you wish to drive—simultaneously . . . or how many holes you want to drill—simultaneously . . . you're limited only by the air supply available in your plant.

Tools can be positioned to match any horizontal drilling or fastening pattern, and to compensate for any differences in vertical position of screws, nuts or work-piece. A Buckeye multiple-unit tool will drive screws and nuts of different sizes and types . . . will drill holes of different sizes and depths—and do either job simultaneously. Tool capacities, in multiple units, are identical to individual tool capacities.

Buckeye multiple-unit fastening and drilling tools are engineered to your specific requirements. They may be arranged on self-supporting arms, as illustrated, or designed for suspension above the work. Just send a letter or sketch, outlining your assembly operation, or ask to have a Buckeye Tools Sales Engineer visit you. Either way, it costs you nothing to learn how you can step up assembly output and cut assembly costs—simultaneously!

**Buckeye Tools**  
CORPORATION

DIVISION 17 • DAYTON 1, OHIO

producers of  
the world's first  
successful  
rotary air tools

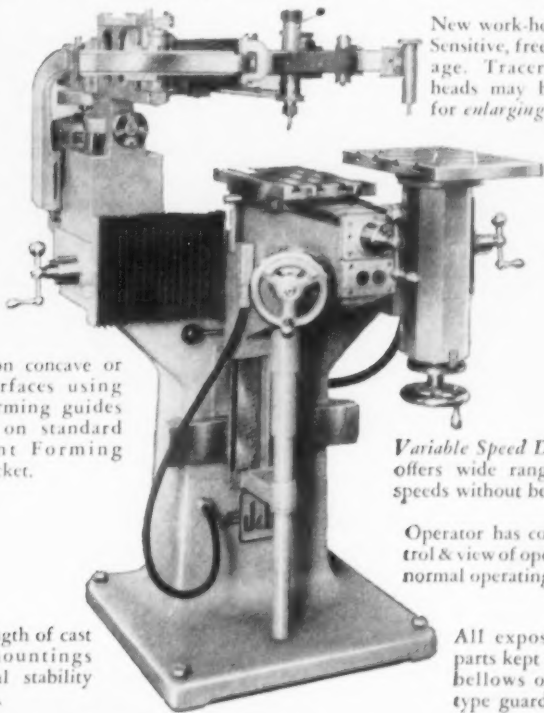
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# NEW 3D DIMENSIONAL

## "Panto-Miller"

Here's full 3-dimensional pantograph-milling performance for precision and production. Each part of this completely new Model 3-A "Panto-Miller" is specifically designed and engineered for dependable, accurate reproduction of 3-dimensional surfaces, flat or curved. It is a sturdy, large-capacity, production machine, worthy of your investigation.



New work-height capacity. Sensitive, free-moving linkage. Tracer and cutter heads may be transposed for enlarging copy.

Engraves on concave or convex surfaces using simple forming guides mounted on standard equipment Forming Guide Bracket.

*Variable Speed Drive* control offers wide range of cutter speeds without belt changing.

Operator has complete control & view of operation from normal operating position.

Massive strength of cast base and mountings gives unusual stability and accuracy.

All exposed moving parts kept chip-free by bellows or telescope type guards.

The "Panto-Miller" is the answer to many standard and special problems in producing or reproducing 3-dimensional surfaces. Write for bulletin PM3



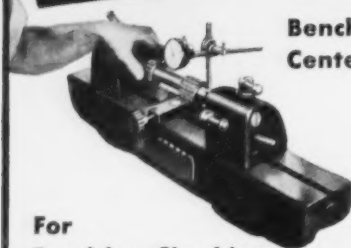
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**JOHNSON & BASSETT INC.,** Production Tool Div., Worcester, Mass.



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Here are three Sundstrand accessories that may prove helpful in your work. A wide range of bench centers and balancing tools are available for checking purposes. The automatic index base has proved a sound addition to many metal working machines. Write for further information.



**Bench  
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Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

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6" x 36"	12" x 60"	24" x 60"
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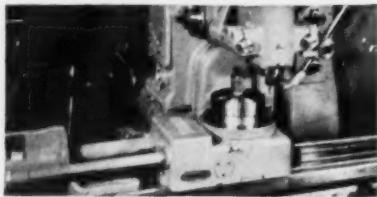
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● Zagar hydraulic drilling machines are designed for high speed drilling—for both production and limited runs. Zagar 4-post machines reduce high cost tooling, and handle a range of work that ordinarily necessitates the use of several different machines. Very important, Zagar drilling machines release capital equipment for other purposes. Zagar 4-post machines lower your capital investment. They quickly pay out. What, sir, are your production requirements?

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Get Zagar's Engineering Manual "S-12" for details on all sizes of 4-post drilling machines.



Zagar hydraulic ram-type 4-post machine drills 150 holes, 5/16" through 5/8" dia. in aluminum casting at one pass.

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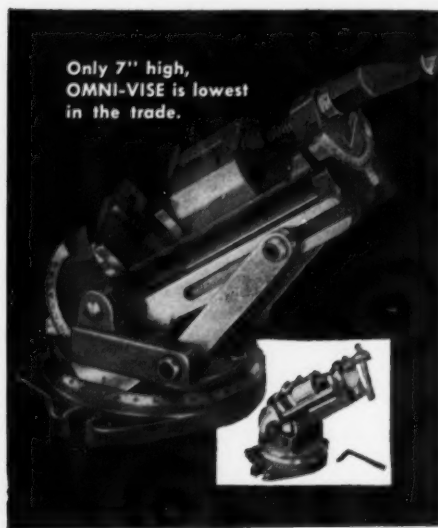


## Make any type spring, without arbors, FAST with Perkins Spring Coiler!

When you need a replacement or experimental spring, any shape, diameter or pitch from flat to round wire sizes .005" to .125", you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of arbors, yet turn out precision springs — torsion, compression, extension tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from  $\frac{1}{16}$ " to 12" and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!



Power model  
for continuous  
runs, on welded  
steel console base



Only 7" high,  
OMNI-VISE is lowest  
in the trade.

## Hold any machine work at any EXACT angle with sturdy OMNI-VISE!

Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7" high (lowest in the trade), OMNI-VISE #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x  $1\frac{1}{2}$ ", open to 4". Base is 9" in diameter with one side straight. Inset shows OMNI-VISE #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height,  $4\frac{3}{4}$ ". Jaws,  $2\frac{1}{8}$ ". Opening,  $2\frac{1}{8}$ ". Base,  $7\frac{1}{4}$ " x 5". For grinding, drilling or general work at any angle, by hand or machine, an OMNI-VISE is the machinist's choice.

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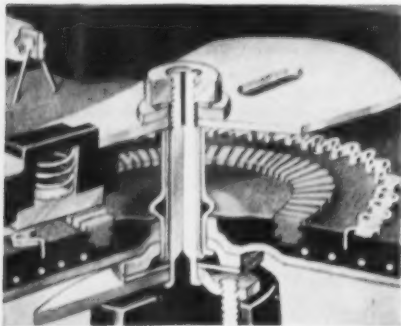




## Extruded Shape Cuts Assembly Over Half



**Ingenious application eliminates hand assembly, makes absolutely uniform stationary contacts in Ward Leonard power rheostats**



**CROSS SECTION VIEW** of a Ward Leonard Vitrolin Type S rheostat showing how contacts are embedded in a vitreous enamel.

Ward Leonard Electric Co., Mount Vernon, N. Y., makes a line of high quality power rheostats marketed under the trade-name Vitrolin. Anywhere from 41 to 161 individual stationary contacts, or buttons, have to be embedded with their resistance elements in an insulating vitreous enamel—all contacts uniformly set and spaced, for uniform performance. Their patented process originally used buttons blanked out of sheet brass—hand assembled and spaced on a steel wire to hold them while the vitreous enamel was fired.

Ward Leonard refined the process and for four models now starts with the extruded shapes shown above. The stock is accurately slotted for correct spacing, forming a continuous line of buttons connected by a triangular "wire"—which is an integral part of the extruded shape. When sections are curved, the buttons remain uniformly spaced and oriented. After the button assemblies are embedded in the vitreous enamel, the connecting wire is easily milled off. Ward Leonard gets absolute uniformity with less effort and fewer rejects—it gets healthy dollar savings, despite the fact that more than half of the extruded shape is milled out.

Imagination applied to extruded shapes can pay big dividends—lower direct labor costs—fewer machining operations—less scrap—improved product quality. Your Anaconda representative will be glad to work with you. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

# ANACONDA<sup>®</sup>

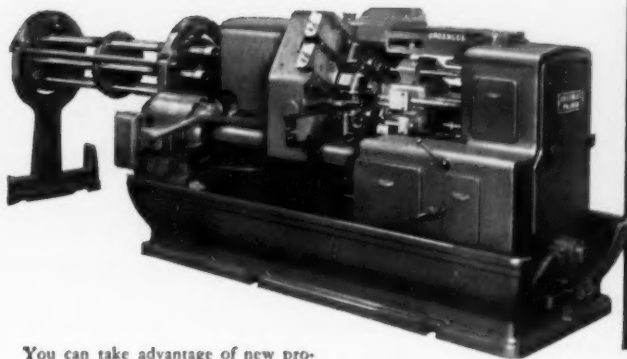
## EXTRUDED SHAPES

**Short cuts to a finished product**

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WITH  
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SIX-  
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AUTOMATICS

You can take advantage of new production techniques...attain higher levels of efficiency with the improved Greenlee 6-Spindle Bar Automatic. Its advanced design opens the door to some real profit opportunities. • These design improvements are fully described in a catalog recently issued. Let us send you a copy today. Find out how Greenlee Automatics can save time and money in your plant. It will pay you to investigate.



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## IMPROVED SPINDLE CONSTRUCTION

The spindle has been completely redesigned to assure greater accuracy at higher speeds. True running... the new Greenlee spindle has five widely spaced, preloaded, angular-contact, precision ball bearings. Entire spindle is dynamically balanced for smooth operation. Metallic seals, labyrinth and friction washers with line contact provide maximum heat dissipation.

## INCREASED SPEED

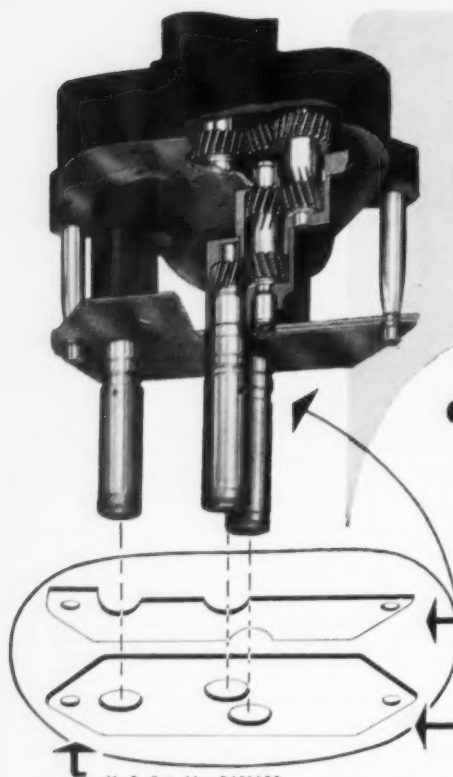
Spindle speed range has been increased. Enables you to take full advantage of the top efficiency and peak performance which carbide and high-speed tooling offer. Reduces downtime losses and tool costs.



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1892 Mason Avenue  
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U. S. Pat. No. 2451123

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**WISCONSIN**  
**DRILL HEADS**  
 have both Locating  
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an *Exclusive*  
**Patented**  
**Feature**

**1 Locating Template**

Each spindle swings into half-holes of locating template for fast, accurate positioning.

**2 Locking Template**

Full-hole template fits over spindles, locking them into exact position.

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**WIDE RANGE**—Each spindle has 3 centers to provide maximum range of bolt circle adjustments. U. S. Pat. No 2441722.

**LONG LIFE**—Helical gears and other moving parts are hardened to resist wear.

**STANDARD PARTS** — Replacement parts for all standard models always in stock.

**SIZE AND CAPACITY**—There are 6 models of Wisconsin Adjustable, Multiple Drill Heads, each in 2 to 8 spindles. Capacity: Wire Size thru 1½" dia. Operating Speeds to 4000 r.p.m.

In addition to Standard Multiple Adjustable Center Drill Heads, Wisconsin builds Special Fixed Center Drill Heads, Lead-Screw Tapping Units, Fixture Bases, Special Machines — both Index and Transfer Type.

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## DESIGN NEWS

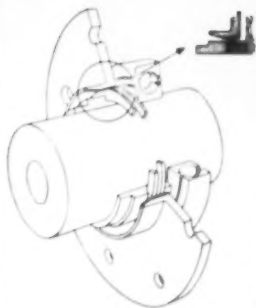
News of Design Problems Solved with Flame-Plating

### Flame-Plating solves "Fretting Corrosion" problems

When tightly fitting parts undergo a vibratory motion, surface failures often occur. One name for this phenomenon is fretting corrosion. In certain cases, where parts are required to operate with little or no lubrication, the effects of fretting corrosion are quite severe. Such was the case of the turbine aircraft engine shaft seal illustrated to the right. This design problem was solved by Flame-Plating the bearing surfaces with tungsten carbide. These Flame-Plated parts now give over twice the required service life.

Flame-Plating is LINDE's service performed in LINDE's plants for depositing a tungsten carbide coating on metal parts. Finished or semi-finished parts made of most metals can be Flame-Plated without distortion as the temperature of the part being plated does not exceed 400 deg. F.

Find out if Flame-Plating can solve your wear problems by calling your nearest LINDE Office today. Or write for your copy of the Flame-Plating booklet.



Flame-Plating solved the fretting corrosion problem which adversely affected the performance of the above turbine shaft seal.

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*design with  
Flame-Plating  
in mind*

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## OVER THE EDITOR'S DESK . . .



### INVESTMENT PER WORKER

The Machinery & Allied Products Institute, in the current issue of its quarterly **CAPITAL GOODS REVIEW**, offers the rough estimate that the present average capital investment required by U. S. business to employ one worker is \$12,500.

Since the durable productive facilities of industry such as plant and equipment represent wasting assets, a large annual investment is required merely to offset this wastage. Based on earlier Institute studies this requirement for offsetting capital wastage is running in excess of \$25 billion a year. This means that it takes an average annual investment of \$450 per worker to maintain jobs already in existence.

To offset a conservative estimate of a 400,000 annual increase in the number of jobs, an additional \$5 billion in capital investment is required. Further, an advancing economy characterized by productivity gains requires a continuous increase in investment per worker. The Institute estimates this annual improvement requirement at \$10 billion.

It is apparent from these figures that if business as a whole is to ab-

sorb the annual growth in the private labor force, offset the current consumption of its fixed assets, and provide for a normal growth in investment per worker, it must find each year \$35-40 billion in long-term capital. This must be the net realization from depreciation allowances, retained earnings, new equity flotations, and long-term borrowing.

In addition to an unprecedented volume of the tools of production, the American worker shares in the sizable business investment in working capital such as inventories, receivables, cash and marketable securities. The Institute estimates that at 1955 prices the per-worker capital investment by type of investment is as follows:

Plant and Equipment (after depreciation)	\$4,900
Land and Financial Resources	2,400
Current Assets	5,200

★ ★ ★

### CHRISTMASTIDE

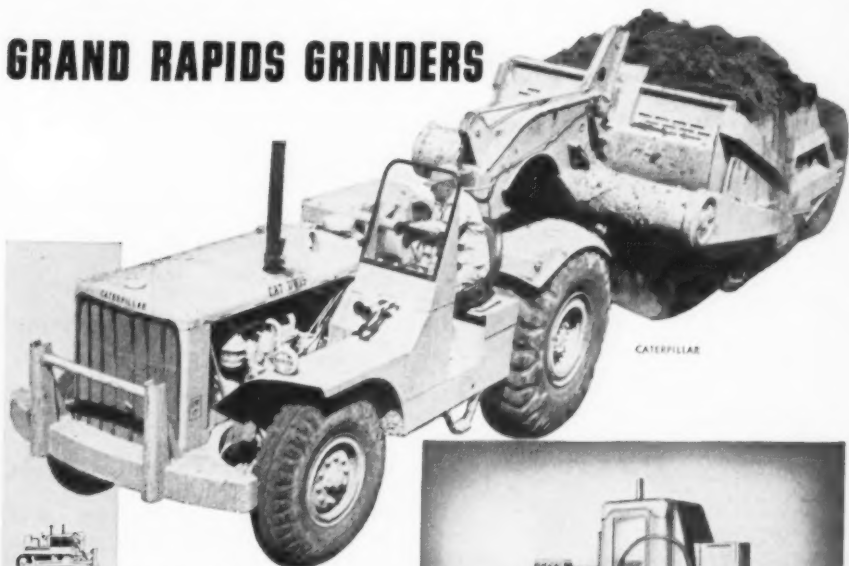
With the fervent hope that each of you will keep Christ in Christmas, we pause to wish one and all

*(Continued on Page 103.)*



FOUND WHERE WORLD FAMOUS TRACTORS ARE "BORN"

## GRAND RAPIDS GRINDERS



ALLIS-CHAMBERS



CASE



DEERE



INTERNATIONAL  
HARVESTER



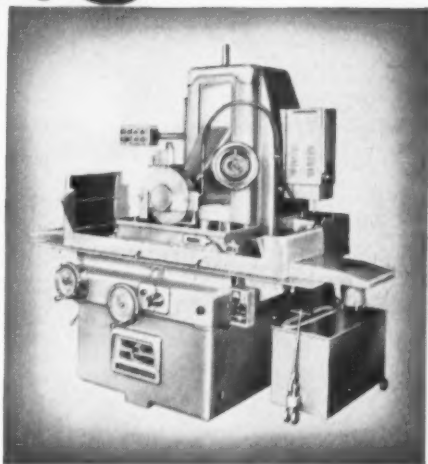
P. G. LATOURNEAU



MASSEY-HARRIS-  
FERGUSON

The makers of these famous tractors and allied heavy-duty equipment use Grand Rapids Grinders in their toolrooms. In fact, you'll find Grand Rapids Grinders wherever manufacturers place a premium on precision... because they're designed and built for lifetime precision grinding. Take our Model 560, shown at right. Its column and base are a massive, one-piece casting for permanent, rigid alignment. Wheel head has powered rapid vertical travel; cross feed and longitudinal travel table are hydraulically actuated. Table speed is variable up to 140 fpm, making this the fastest grinder of its type and size!

If you're not already enjoying these standout features in your toolroom, a note on your letterhead will bring full details.



Grand Rapids No. 560 Hydraulic Feed Surface Grinder. Table speed up to 140 fpm. Working surface of table is 14" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1800 and 2140 rpm.



GALLMEYER & LIVINGSTON CO.

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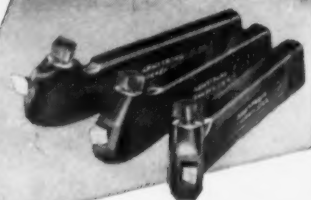
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By providing permanent, multi-purpose, inexpensive ARMSTRONG TOOL HOLDERS that use cutters or bits that are quickly ground from standard high speed shapes (Saving: All Forging, 70% Grinding and 90% High Speed Steel), the Armstrong System of Tool Holders will reduce your tool cost to an absolute minimum.

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There is no surer way to lower costs and increase output, than to use the correct ARMSTRONG TOOL HOLDER for each operation on all machines.

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# Merry Christmas



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**modern  
machine  
shop**

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# FEATURES IN T

## **PIGMY TO GIANT WITHOUT SPECIAL DIET**

**By Gilbert C. Close**

In this interesting presentation, the author describes the rapid growth of airplant machine shops in the past 20 years and how this growth was accomplished using common-sense principles available to every shop operator. Page 106.

## **CLINOMETERS AND THEIR APPLICATION**

**By K. J. Hume**

The advantages of these versatile instruments in performing various inspection operations are illustrated and described. Page 114.

## **THE BRAND-NEW SUPERVISOR**

**By Alfred M. Cooper**

In this article, the author endeavors to assist the newly-appointed industrial supervisor—gang boss, assistant foreman, section head, or foreman—by providing him with helpful suggestions regarding effective methods of handling people. Page 116.

## **CONVERTED LATHE BORES DRILL HOOK HOUSINGS**

This article explains how a manufacturer of oil tool drilling equipment has reduced by one-half the time required for boring large cast steel drill hook housings by using a converted heavy duty lathe. Page 124.

## **HOW TO FABRICATE WELDED STEEL TUBING**

**By W. E. McFee**

In continuing his discussion of welded steel tubing fabrication, the author covers swaging, tube-end forming, punching and notching, and drilling. The concluding installment of this article will be published in the next issue of this magazine. Page 126.



**DECEMBER**

**1955**



# N THIS ISSUE

## **UNIQUE PRESS APPLICATIONS AT CADILLAC**

**By Robert I. Shore**

At the Cadillac Motor Car Division of General Motors Corporation in Detroit, Multipresses are used in two specialized applications to speed production; namely, (1) to straighten valve rocker shafts and (2) to press-fit wrist pins into holes in pistons.  
Page 132.

## **GAGING AUTOMOBILE PUSH RODS**

A fully automatic conveyor-fed sorting gage built by Federal Products Corporation is an integral part of the production line of a leading automotive equipment manufacturer wherein the gage measures six conditions on automobile push rods.  
Page 134.

## **HIGH SPEED DRILLING OF CAMERA PARTS**

Camera manufacturer solves problems in machining camera bodies and flash attachments by designing his own production machinery. Page 136.

## **PRODUCTION BY COMPRESSED AIR**

**By Edmond C. Powers**

Several applications of compressed air are mentioned in this article to illustrate the benefits that the Tyce Engineering Company of Chula Vista, California, an aircraft parts subcontractor, has gained from the increased use of this versatile power.  
Page 142.

## **GRINDING COLOR TV DEFLECTING YOKES**

An automatic three-stage grinder developed by The DoAll Company enables the Radio Corporation of America to efficiently grind segments of deflecting yokes used in color television receivers.  
Page 150.

**VOL. 28**

**NO. 7**





# pigmy to Giant . . . without



***An article describing the rapid growth of airplant machine shops in the past 20 years, and how this growth was accomplished using common-sense principles available to every shop operator.***

By GILBERT C. CLOSE

**Of the many seemingly industrial miracles** that have been performed in the past quarter of a century, few exceed in scope the growth, development, and rapid maturity of the modern airplant machine shop. Twenty years ago, when airplanes were literally pieced together using hand-formed sections of light-gauge sheet metal, the airplant machine shop was practically a nonentity in the production picture. The average shop was relegated to some unused corner of the building, and turned out a few machined castings and forgings, with a small amount of reaming and drilling thrown in now and then for good measure.

Today the airplant machine shop is a major part of all production programs in a vastly expanded industry. Hundreds of machines and hundreds of employees work multiple shifts to fulfill the demand for machined parts. Because of vastly increased strength requirements, many airplane parts, formerly made of sheet metal, are now carved from huge billets or heavy plate, or are cast or forged in huge sections which require a large amount of critical machine work prior to installation. Massive reaming, honing and broaching operations are common production jobs. Actual tolerances of 0.0001 inch and effective toler-



## t special diet

ances of 0.00001 inch are ordinary achievements.

**How was this rapid growth and maturity accomplished** without confusion and mis-direction? What techniques were employed to keep all facets of machine shop production expanding on an even keel? What controls were employed to keep a shop, constantly in a state of flux due to this rapid growth, working toward increasingly critical tolerance demands?

The answers to these questions are not astounding, nor do they imply any "miracle" performance. Summed up, they add to good common sense, and imply only the constant application of principles of machine shop operation which are too often ignored. These same principles will apply, perhaps even more effectively, in shops unhampered by growing pains and the state of flux that has beset the aircraft industry since its birth as a mass production medium.

To get the answers, this writer contacted Mr. A. R. Frank, General Foreman of the machine shop at Northrop Aircraft, Inc. Mr. Frank has been a machinist all his working life, has been with Northrop for 15 years, and helped guide and develop the Northrop machine shop from its "blacksmith" status 15 years ago to its present status as one of the nation's outstanding precision machine shop organizations.

Mr. Frank seemed surprised that the Northrop accomplishments should warrant curiosity and, in this surprise, he voiced a comprehensive answer to the entire problem. "We merely apply all known principles of machine shop operation, both technical and psychological, and in a

(Above left) View of Northrop machine shop—1945 version. (Above right) Partial view of Northrop machine shop today.





Machines of similar types and performing similar types of operations are grouped in "zones." The "zone" shown herewith contains a number of small precision mills.



**"Too many shops overemphasize certain aspects of operation at the cost of others . . ."**

manner to bring out the best features of each. Too many shops overemphasize certain aspects of operation at the cost of others, and end up with a mis-balance. Good men, good machines, efficient material handling, high shop morale, and constructive liaison with other production and the engineering departments have solved the problems for us."

Mr. Frank pointed out that constructive liaison between departments has been instrumental throughout the growth of and in current operations of the Northrop shop. "We even went so far as to have organized Northrop engineering groups visit the shop and thus become familiar with specific shop problems so they could temper their designs accordingly," he said.

**"Good planning is a requisite** to efficient shop production, and assures work loads that conform with assembly line consumption of machined parts. This requires close liaison between the shop and the Planning Department. The same close liaison must be maintained with Manufacturing Control and Inspection, with the Cost Department and with Scheduling.

"In the aircraft industry, the machine shop is just one member of a team working toward the same difficult goal. Teamwork is just as necessary as it is in pushing over the winning touchdown!"

Mr. Frank points out that high morale is important in maintaining

shop efficiency in the face of constant changes and short-run production work. No machinist can rest secure in his knowledge of how to produce or handle a specific job. An order for a hundred identical parts is a large one. More often this figure plummets to fifty or even twenty-five parts, and single prototype parts are common.

**This constant changing of jobs** on each machine requires the ultimate in supervision, but such supervision must be imparted in a cooperative, not mandatory manner. Here is where the psychological angle appears. To ease this situation, the machinists are divided into specific classifications as to experience and ability. When a man is graded in a specific classification, he soon comes to accept without question the amount of supervision his classification demands.

Another psychological incentive employed at Northrop is a good promotional transfer setup. There are definite limitations in any machine shop as to how far an employee can progress. When and if a Northrop machinist exhibits exceptional ability in any direction, he is readily promoted to a department where he can use this ability to the greatest advantage. Many supervisory positions at Northrop are now filled by employees who emerged from the machine shop via this promotional transfer system.

As to actual machine shop opera-



*"... one responsibility of a machinist ... is housekeeping in the vicinity of his machine."*

tion, Mr. Frank has specific ideas which have aided materially in establishing the Northrop shop at its present high level of critical productivity. "Good machines, efficiently placed and properly work-loaded, are necessary," he says. "The machine operator must be free of extracurricular responsibilities except for good housekeeping. Supplementary shop organizations must supply him with work when it is needed and take it away after it is done. The operator's experience and ability should be such that it is not necessary to hamper him with constant in-process inspection while he is doing a job."

Insofar as practical, the machines in the Northrop shop are located in specific zones — the milling zone, lathe zone, drill press zone, burr and identification zone, and rework zone. This does not mean, however, that the machines are rigidly segregated. Common-use machines — drill presses, pedestal grinders, and so on — are located so that no machine operator has to move far to use one of these units.

**While overall work-loading** of the machine shop is a function of the Planning Department, work-loading and work distribution among the various machines is a function of the shop's "Make Ready" division. The Make Ready division receives the incoming shop work and "packages" it along with all the necessary tools, blueprints and instructions neces-

sary to do the job. The foreman in each machine shop department acts as the liaison man between the individual machine operators and the Make Ready division. When a job is finished on a specific machine, it is his duty to see that it is routed on to inspection while a new job for that particular machine is ready and waiting. The Make Ready division keeps a list of all outgoing work and where it is routed. This list serves as a convenient and practical guide in readying future jobs for specific shop departments.

**To further relieve the operator of any responsibility** except for the job on hand, all machine adjustments, repairs, and lubrication are handled by the plant Maintenance Department. All machine tools packaged with each job are "ready for use," and only a top grade machinist can alter a tool in any way and this is limited to tool bits and drills.

The one responsibility of a machinist over and above turning out the job is housekeeping in the vicinity of his machine. And even here a psychological incentive is employed. Monthly awards are given out to the various plant departments for good housekeeping. The Northrop machine shop won this award three times during 1954.

**While standard or approved tooling used** at Northrop is a product of the Tooling Department, the many changes and rapid pace in





*Turret lathes occupy this particular "zone" in the present-day Northrop machine shop.*

December, 1955

modern machine shop 111



***"... Northrop Machine Shop maintains its own small tool shop where ... emergency-use tools are turned out ..."***

aircraft development often makes it inconvenient to wait for the development of a standard tool. To offset this, the Northrop machine shop maintains its own small tool shop where what are termed "shop aid" or "non-designed" emergency-use tools are turned out directly from information secured from the blueprint of the part to be machined. In many cases these emergency or "shop aid" tools are approved "as is" by the Tooling Department, and thus become standard and approved tools. This "stop-gap" tool production has bridged many chasms of waiting for a standard tool which would have otherwise seriously disrupted scheduled shop work.

"We at Northrop are only one of many airplant machine shops which have grown from experimental size into enormous production shops since the outbreak of World War II," Mr. Frank says. "And to my knowledge, we have all followed much the same pattern of growth and development.

"We adhere to a rigid production pattern, yet at the same time we maintain an inherent flexibility that permits us to encompass growth when it is necessary and changes when they occur.

"While the growth of the airplant machine shop within a few years to its present state of maturity and ability may seem miraculous to an



*A. R. Frank (center) discusses a production problem with a departmental foreman.*





*A group foreman receives a complete machine job from the Make Ready department.*

outsider, we in the industry know it is the result of steadfast application of principles, incentives and

controls which can be used in any shop regardless of its age, size, locality, or the products it turns out."

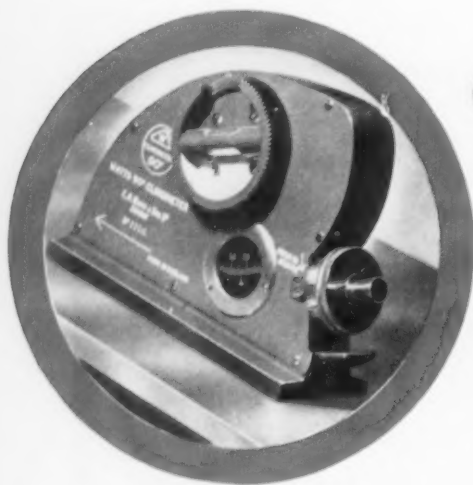
★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

**Bearing Lubrication Analysis.** By Robert R. Slaymaker. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 108 pages. Illustrated. Cloth binding, board covers. Price, \$5.00.

Written for the machine designer rather than the lubrication specialist, this book covers the general principles of lubrication analysis in bearing design. Its treatment, though concise, is broad enough to provide the insights needed to design actual bearings for simple cases and to handle the important preliminary planning for more complex applications where a bearing spe-

cialist will later be consulted. The treatment stresses sleeve bearings, the most common type of bearing found in machines. Its discussion is fully illustrated with case studies and numerical examples. There is a useful outline of hydro-dynamic theory as a guide to the design of bearings lubricated from an external source, a discussion of the characteristics of various bearing materials, and an analysis of the so-called oil-less bearings intended to perform without an external supply of lubricant. Throughout the book, the vital topic of oil viscosity is emphasized in a clear manner.





**The clinometer is a type of instrument which is often overlooked** when problems arise involving the measurement of angles, whether in the shop or toolroom or in maintenance or production departments. It provides a convenient and flexible method of measuring angles in a vertical plane about a horizontal axis, particularly when the surfaces or locations involved are separated by some distance or have obstructions between them. The fact that the true vertical, as defined by gravity, is used as a reference eliminates the usual errors and difficulties caused by measurement at separated positions and provides readings directly in terms of angle without conversion from indirect measurement.

An outstanding example of the use of clinometers to improve production checking is the case of aircraft propeller blades. On variable pitch propellers particularly, the accuracy of the helix angle on the face of each blade at various distances from the hub is very important. The

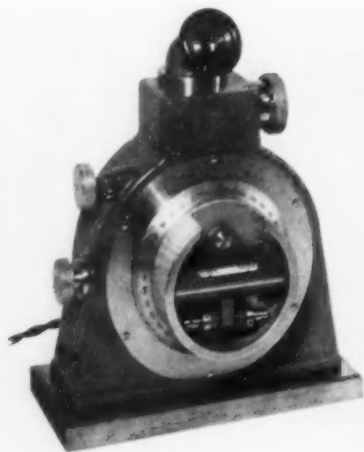
## Clinometers and

**Advantages of these versatile instruments in different operations are outlined.**

By K. J. HUME

previous method used was to measure these angles with a large protractor working from a surface table about 10 feet long. The surface of this table, of course, had to be leveled all over to a high degree of accuracy—a very time-consuming process. With the use of clinometers reading to one minute, the need for this leveling was eliminated and, at the same time, the accuracy of measurement was considerably increased.

In the toolroom, the checking of large jigs and fixtures often pres-



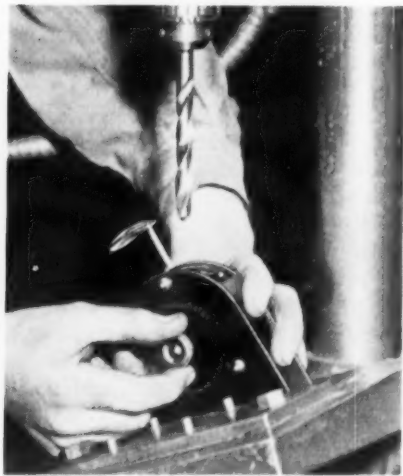
*Illustration of a precision clinometer offered by Engis Equipment Company, Chicago.*



# Their Application

ents difficult problems in the measurement of angular faces and locations. Whatever the accuracy required, in most cases a clinometer can do the job since there are types available reading from 10 minutes to 1 second. On many fixtures of the larger type, a higher accuracy than one or two minutes is not required and it is in this type of work that measurements can often be expressed in terms of angle. The positioning of holes or bores in a vertical surface, for example, can be checked very rapidly by this method.

Moreover, a small clinometer provides a practical means of measuring relief angles on large cutting tools and milling cutter inserts. An instrument which reads directly to



*This illustration shows an M. C. clinometer being used in setting up drill press table.*



10 minutes is adequate for the purpose, and, by equipping it with a special short knife edge base, the instrument can be located on tool faces.

**A clinometer is useful also for setting adjustable angle plates,** for machining, inspection or layout purposes. A one-minute reading clinometer enables rapid setting to be achieved with an accuracy sufficient for most purposes.

Problems peculiar to production and maintenance departments can be solved in a similar manner. The measurement of alignment and relative angles of shafts in machine repair and installation work is sometimes difficult because there is no convenient reference point from which to work. For such purely relative measurements a clinometer is an ideal instrument since its reference line—the true vertical—is constant and always present.





***The author endeavors to assist the newly-appointed industrial supervisor—gang boss, assistant foreman, section head, or foreman—by providing him with helpful suggestions regarding effective methods of handling people.***

By ALFRED M. COOPER

**The newly-created industrial supervisor**—gang boss, assistant foreman, section head, or foreman—may well have had no previous experience, and little training, in effective methods of handling people. He is in something of a spot, and since so much of the well-being of his new subordinates, and even of the company's welfare, may depend on how he makes out, he should at this time receive patient instruction and complete cooperation.

The fate of the new supervisor is particularly important, since there are so many cost factors involved in poor supervision—loss of time, spoilage of material, increased accident rates, and impaired worker morale—and this new fellow is almost certain to make mistakes. The effect of these particular errors may not at once be evident.

Then too, it is from good workmen that supervisors are made, and from foremen come general foremen, superintendents, and works managers. What happens to a single new supervisor during his formative period may well affect the quality of supervision in that plant for years to come.

And just about everything seems to happen at once to this green hand at handling people. The chances are he was outstanding as a worker, or he would not have been given the new job. His boss must have thought he had the makings of a competent supervisor. But now he cannot make good by turning out a good mechanical job. He must learn a new trade, using human tools, and get his results wholly through the efforts of others.

This is not easy. *It is little wonder*



*that many newly-appointed supervisors come to their boss within a week or so and beg to be put back on their old jobs.* These men were good at those jobs; they know they are not setting the world afire as supervisors. They wish to again excel through the work of their own hands, rather than to be forever at the mercy of the whims of temperamental subordinates. That is the way I have heard these men explain their failure as supervisors.

Fortunately, most young supervisors sweat it out, and eventually do master this new trade of supervision. All have a number of tough lessons to learn first. Here we can enumerate some of the most difficult. **Most brand-new supervisors** have been chosen from a group of fellow-workers to become the boss of these people. Right here occurs one of the most difficult transitions any industrial worker ever is called upon to make. One facet of this problem often takes the form of a decision that must be made at once. Suppose the new supervisor has in the past been particularly friendly with individuals among the people who now report to him. These people he had been in the habit of meeting with socially, outside of working hours. The question is, must the new supervisor break off these friendly after-hour contacts, or can he continue them?

This neophyte at supervision does not want anybody to think his new authority has gone to his head. He doesn't want to give the impression of high-hatting anybody. He feels that a sudden breaking-off of old social ties may even convert these good

friends into enemies. Yet, increasingly it is borne in on him that continued close friendships with individuals reporting to him is going to be taken as a sign of favoritism by that majority of his subordinates who are not included in his social activities.

**Perhaps the new supervisor is positive** he can keep social and business matters separate. Perhaps, for example, he is sure he can recommend subordinates for increases of pay, or for promotion, purely on a basis of merit. But he is also aware that, *should one of his cronies happen to be the best man for a better job, the work force may be excused for wondering audibly whether or not his decision was influenced by friendship.*

Sooner or later the new supervisor is going to discover that he cannot, in fairness to all, hobnob with a few of his subordinates to a greater degree than he is willing to do



*"It is little wonder that many newly-appointed supervisors come to their boss . . . and beg to be put back on their old jobs."*



*"... social contacts with a favored few subordinates is bad business ..."*

with all of them. Most supervisors with whom I have discussed this problem state that this is just a part of the price of getting ahead.

But even when a supervisor has made up his mind to break with his old cronies, sometimes he has trouble figuring just how to accomplish this with least friction all around. One section head put it to me in this particular fashion:

"For eight years I had been in the habit of playing bridge during the noon hour with three fellow-workers. Three years ago I was made supervisor of these people and thirty others. For three years, now, I've been trying to think up a good excuse for dropping out of that bridge game."

This fellow never did solve his problem. He knew this fraternizing might affect his reputation for fairness and impartiality. But he could not quite bring himself to take action in the matter.

**Most experienced supervisors contend** that social contacts with a favored few subordinates is bad business, but that on the occasion of a departmental after-hour social affair the supervisor should make a special effort to be a good mixer with the entire work force.

Many industrial organizations carry on formal courses of training in foremanship, but since the discussions in such training groups are based on experience, the new supervisor can take little part in these. However, I have found it practicable

to include a few employees who are considered to be supervisory material in such conference groups. In general, these potential supervisors learn most when they listen carefully to the opinions expressed by the older men, rather than by offering theoretical solutions to problems with which they have had no actual contact.

If the newly created supervisor can arrange matters so that his subordinates consider him fair and impartial, playing no favorites, certainly he has made progress. But there are also other requirements he must meet. Two very important ones are that he must be both well liked and respected by those reporting to him.

Many new supervisors never appear to make distinctions here. We have all seen novice bosses who made



*"... the force may be wondering whether his decision was influenced by friendship."*



a big play to win popularity. They are hail-fellow-well-met with all their subordinates. They pat everyone on the back, indiscriminately. They make lavish promises, many of which they know they cannot fulfill. They appear always to consider themselves as entered in a popularity contest.

*Management likes to promote to supervisory jobs men who are well-liked by everyone.* Conversely, the man who is pretty well disliked by his fellows almost certainly will be passed over when promotions are in order. The reason for this is, of course, obvious.

But a big play for liking may well backfire on that popularity contestant. For a time he may succeed in winning the liking of his subordinates. Sooner or later, however, if he is to be at all successful in his job as a supervisor he will find it necessary to either crack down a bit on certain individuals or lose the respect of the entire work force.



*"Management likes to promote to supervisory jobs men who are well liked by everyone."*

**Enforcing discipline does not win liking,** but it does increase respect. Some new supervisors lean over too far in this direction. They win respect but may build too much ill-will. These, too, find themselves in trouble.

It would seem that the new supervisor must make a real effort to be liked and respected, and to maintain a nice balance here. If the new boss gets prompt obedience to a direct order, and if even his suggestions receive thoughtful consideration, then he probably has the respect of his employees.

If he has this respect, yet is not feared or hated by any of those reporting to him, he probably has attained the balance sought. This is the type of supervisor management is constantly seeking as material from which to fashion top-flight executives.

**The newly-created supervisor is in a peculiarly vulnerable position.** He must for a time feel his way, and he needs all the help and cooperation he can get. The good will of his subordinates is essential. He must also secure the cooperation of his brother supervisors, and of his own superior.

*There are two best ways to win cooperation: (1) by doing things for people, and (2) by permitting people to do things for you.* The new boss will do well to practice both of these methods.

Among supervisors of equal rank, in particular, he must make a special effort to secure cooperation. No matter how gruff any of these fellows may happen to be, he cannot afford to be grouchy also. Even the



**"... a newly-created supervisor should be given a full measure of support and backing . . ."**

most uncooperative Scrooge can be softened to some extent by continued friendliness. And the new man cannot afford the luxury of having enemies.

Most executives contend that a newly-created supervisor should be given full measure of support and backing, and advice whenever he needs it. After that, say these higher-ups, the new man is pretty much on his own. They will do all they can to help him get started, but they refuse to "carry" a weak sister, even though he be the boss' nephew. (Incidentally, I have noticed that the boss' relatives nowadays appear to have a tougher time of it, comparatively speaking, than an unknown. Everybody along the line, including the boss, wants to prove that he plays favorites with no one, and the

boss' son may be in for a real bad time.)

**The new supervisor must learn much** of his new trade the hard way. He must be able to profit by his mistakes and refuse to repeat these. Sometimes he will subconsciously pattern his behavior after that of some earlier boss he has had whom he considered to be about tops. Or he may make an effort to avoid doing irritating things another supervisor of his was always doing—things that rubbed everyone the wrong way. This sort of learning is hard, but it is effective.

One thing that will look different to the newcomer to supervisory rank is the matter of giving information to his superior. As a workman he abhorred the thought of talebearing, and rightly. As a supervisor he will soon find that he cannot play fair with his superior unless he keeps this executive informed as to what's going on in his department. It is all a matter of intent; he is not trying to hurt anybody, but there may develop situations which only the superior can properly handle, and unless he is kept informed no action will be taken.

**There are other instances in which the new supervisor must choose between two loyalties.** In almost every such case his new job makes it imperative that his primary loyalty be given to his superior and to his management. As a supervisor he has become a part of management, and old loyalties must



"There are two best ways to win cooperation: (1) by doing things for people and (2) by permitting people to do things for you."



now be re-examined with this fact in mind.

Management has recognized this. A speaker at a management association meeting once said, "In our company we look on supervisors as junior executives, and treat them as such. They have reserved parking space and other executive privileges. And, of course, they are paid more than anyone reporting to them." Successful transition from worker to boss man may call for fundamental changes in the new supervisor's habits of thinking.

Mention has been made of the temptation facing the newly-created supervisor to make rash promises. These may deal with such matters as promotion or increased pay for one or more of his subordinates. He may be feeling in an expansive mood and wants to see everybody else happy. *So he gets himself out on a long limb and then finds he is not going to be able to make good on the promises that he has made.*

This appears to be one of the instances in which the novice must learn from experience. After he has had to take water a couple of times, and explain to disappointed subordinates that he can't deliver, he will be cautious of giving his word until he knows he can deliver.

**The best supervisor** I ever had would go all out to improve the pay and working conditions of his subordinates, even to the length of making himself somewhat unpopular in the front office. But he never promised anyone anything. Not only that, but he would never acknowledge to a subordinate that he had been in any way instrumental in getting him

a raise. Obviously he felt that the facts had to speak for themselves.

This same unusual boss had another practice I believe to be almost unique. Those people he had in mind for promotion he treated in a rather standoffish manner. With the others—those he felt had reached their natural limit—he fraternized freely on the job. Certainly this practice resulted in his attaining a remarkable reputation for fairness. He never promoted a friend. It also made it possible for him to crack down on a newly-appointed supervisor, since his relationship with that individual had always been strictly business. And he did. He demanded, and rightly received, top-notch performance.

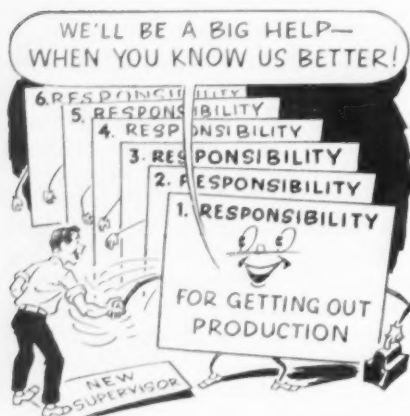
**It is altogether excusable for the newly-made supervisor** to experience for a while a mild case of swelled head. It won't last long, since the bewildering multitude of new responsibilities that go with authority



*"... he gets himself out on a long limb and then finds he is not going to be able to make good on the promises that he has made."*



*"Once a supervisor knows exactly what his responsibilities are he can make an effort to prorate his time . . ."*



*"Industrial supervisors in many plants appear to agree that their general responsibilities may be listed . . . responsibility for getting out production . . . responsibility for safety."*

will soon make him wonder how anyone could be as dumb as he seems to be. So long as he has not made enemies during the first flush of pleasure at his promotion, there is no harm done.

One thing that will help any new supervisor is to make an analysis of his supervisory job. He can readily do this, and should do it, since only thus can he learn just where his responsibilities begin and end. No two supervisory jobs are exactly alike.

*Industrial supervisors in many plants appear to agree that their general responsibilities may be listed somewhat as follows:*

1. Responsibility for getting out production.
2. Responsibility for safety,

health, and physical condition of subordinates.

3. Responsibility for developing morale among subordinates.

4. Responsibility for cooperation with superiors, fellow-supervisors, and subordinates.

5. Responsibility for training and developing subordinates.

6. Responsibility for keeping records and reports.

In general, supervisors agree on the above as a fair order of importance, in terms of the amount of damage that may be caused if a responsibility is overlooked and therefore the effect of such oversight on the good record of the supervisor. Each of these general responsibilities may be further broken down into a detailed list of the specific duties in a given department that fall under each broad heading.

**Whether or not the detailed analysis is made,** the new supervisor should carefully study that list of general responsibilities for two reasons. First, he should thus assure himself that he is taking care of everything for which he is responsible. Second, he can thus determine exactly where his jurisdiction ends and that of other supervisors begins. That way there will exist no hiatuses and there will be no overlapping. Either of these evidences of obvious lack of study can result in friction and loss of time and material.

Once a supervisor knows exactly what his responsibilities are he can make an effort to prorate his time



and energy between these. Of course, the importance of various responsibilities changes from time to time, and thus the amount of time and effort devoted to each must remain flexible.

**If a supervisor has learned to spread himself** over his entire job, neither slighting any responsibility nor giving too much time to any, then his supervision is said to be balanced and complete. If he is lopsided in these matters he gives too much of his time and attention to unimportant tasks and never seems to have time for those things that sorely need looking after.

Good supervisors often have hobbies in supervision, stressing some phase of the art. But these supervisors contrive to do this without slighting other equally vital matters.

*The brand-new supervisor, whether he is aware of the fact or not, is on trial.* A number of people of superior rank are watching him, critically but hopefully, ready to help, yet appreciating that in the final analysis he must stand or fall through his own efforts. If he makes the grade he is in direct line for the very best jobs in industry. If he proves he hasn't got what it takes, he is regretfully replaced.

If he makes good, his immediate superior, in particular, will be happy, since he recommended the new boss and likes to feel that he can tell a good man when he sees one. If the new supervisor fails, everyone who had a hand in selecting him for the job feels let down.

Once a man has been given a shot at a supervisory job he should make every effort to master the new trade

before conceding he hasn't got what it takes to handle men. Management seldom insists that a man should fail twice as a supervisor.

**Promotion to supervisory rank** is at once recognition of consistently good work on the job, and the opening of a new door to advancement. In our way of doing things in industry, the most natural path to promotion lies in supervisory channels. A man learns to handle a few subordinates, then a hundred, a thousand, fifty thousand.

That's the principal difference between a foreman and a works manager—the number of people he can successfully boss. It's all a matter of degree. As fast as a supervisor proves he can get results with those reporting to him, he is given a bigger, better-paying supervisory job. Management must be forever on the lookout for top-flight executive material. And, of course, the place to find efficient administrators for the future is in the present supervisory force.

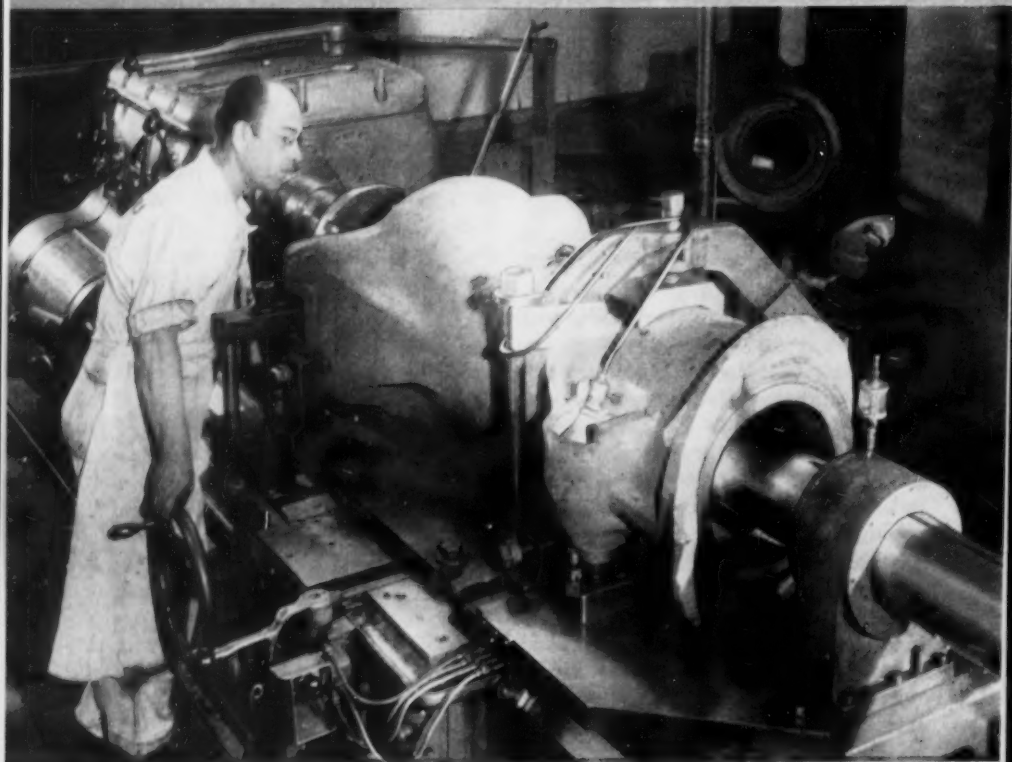


*"The brand-new supervisor, whether he is aware of the fact or not, is on trial."*



# Converted Lathe Bores Drill Hook Housings

*Manufacturer of oil tool drilling equipment halves boring time for large cast steel drill hook housings with converted heavy duty lathe.*



Shop engineers at the Byron Jackson Company in Los Angeles, California, recently converted the 10-year-old Axelson heavy duty

lathe shown herewith to halve the time required for the boring of large and sandy S.A.E. 1045 cast steel drill hook housings.



**Boring time for large S.A.E. 1045 cast steel drill hook housings** was more than halved in a recent operation at the Byron Jackson Company in Los Angeles, California, where a 10-year-old Axelson heavy duty lathe was converted to use simultaneously three cutter heads—each equipped with four standard Kennametal Style AL and BL tools, Grade K2S. The Byron Jackson Company, manufacturer of oil tool drilling equipment, had been completing the operation—until the conversion—by boring and counterboring three separate diameters in each housing on a conventional horizontal boring mill.

Shop engineers at the Byron Jackson Company—creating the time-saving method—converted the Axelson lathe to a special purpose horizontal boring mill by removing the cross slide and mounting to the carriage a rugged saddle fixture which featured changeable shoes for accurate and fast setup for various size castings. A hydraulically-controlled unit, attached to the end of the converted machine, actuated a slide support for the extended end of the boring bar—retractable for loading and unloading castings.

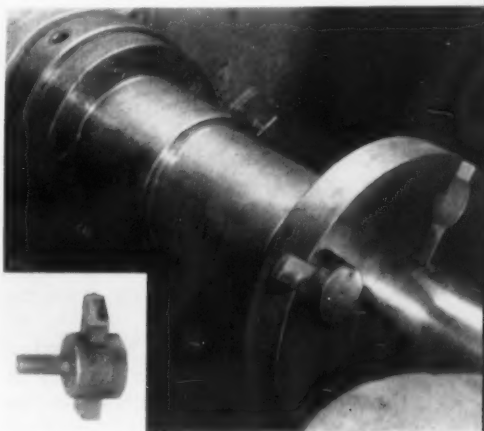
Then, company engineers bolted a two-piece boring bar directly to the spindle nose. The boring bar has three movable cutter heads for facing to different shoulder dimensions. Counterbores in each cutter head locate four circular toolholders and milled key slots back up the tools during the rough boring and facing cuts. Toolholders are designed for rapid changing of preset Kennametal brazed tools and can be changed

quickly by removing a  $\frac{3}{4}$ -inch nut securing them to the cutter head. Because of the high number of sand inclusions in the castings, tools are changed after each cut to ensure free cutting and true bores.

**The housings are rough and finish bored at three stations simultaneously** and then faced and counterbored in  $3\frac{1}{2}$  hours as compared to the old time of eight hours. In hook housing operations, close concentricity is a vital factor in the bores and counterbores.

In boring and counterboring the three concentric diameters, the feeds per tool were 0.016 inch for roughing and 0.019 inch for finishing. Surface feet per minute was 180 and depth of cut  $\frac{1}{4}$  to  $\frac{5}{8}$  inch in the roughing operation; s.f.m. and depth of cut for finishing were 670 and  $\frac{1}{8}$  inch.

Tools used in the California firm's operation were manufactured by Kennametal, Inc., Latrobe, Penna.



Three cutter heads—each equipped with four standard Kennametal Style AL and BL tools, Grade K2S—are used on converted lathe.



# How to Fabricate Welded Steel Tubing

*In continuing his discussion of welded steel tubing fabrication, the author covers swaging, tube-end forming, punching and notching and drilling.*

By W. E. McFEE

Supervisor, Product Information Service,  
Armco Steel Corporation

The preceding article covered bending practices in the fabrication of welded steel tubing. Now we move on to swaging, tube-end forming, punching and notching, and drilling operations.

## SWAGING

Also known as rotary reducing, swaging is a highly perfected form of hammering. It is an excellent method of reducing symmetrically cross-sectioned tubing to a round section of desired diameter. The process consists of short blows delivered in rapid succession by dies, especially made to produce a specified shape. The sketch in Fig. 1 illustrates how a typical rotary swaging machine operates.

Dies (A) are backed up by bumpers (B), fitted to move radially in the slot in the end of the main or spindle shaft (C). As the shaft rotates, the bumpers (B) strike successively against diametrically opposite rolls (D) which are loosely supported in cage (E), causing a

blow through the dies (E), causing a blow through the dies on the workpiece. Between blows centrifugal force causes the bumpers and dies to snap outward radially in readiness for contact with the next set of op-

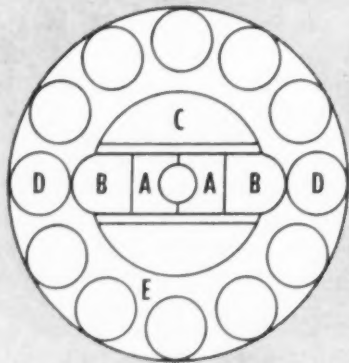


Fig. 1—Sketch illustrating how a typical rotary swaging machine operates: As shaft (A) rotates, bumpers (B) strike successively against diametrically opposite rolls (D) which are loosely supported in cage (E), causing a blow through dies (A) on workpiece.



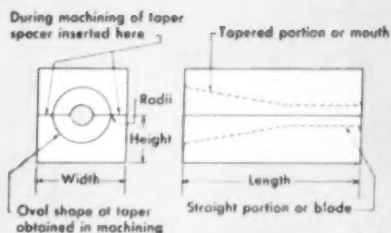
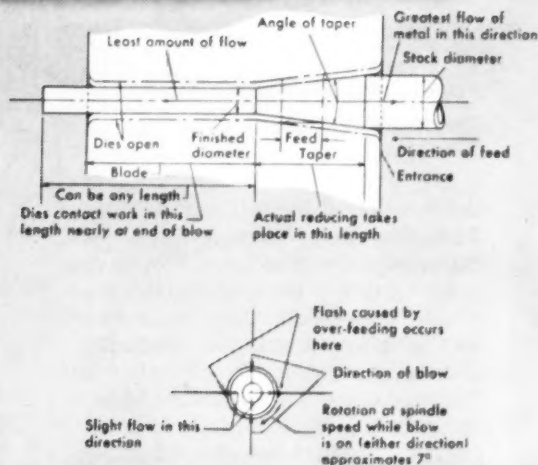


Fig. 2—Reducing dies have tapered entrance large enough to permit entry of unreduced workpiece. Most of the operation is done by

bottom area of die cavity; matched dies possess what is known as "ovality." Sketches show grinding setup and corner relief.

posite rolls. Several thousand blows are struck each minute. As an example, a machine with 10 rolls op-

erating at 350 r.p.m. will deliver almost 3,500 blows per minute, the reduced proportion being caused by

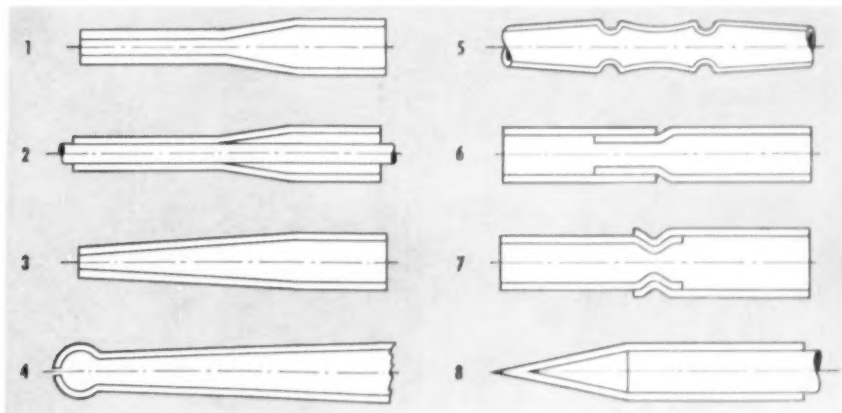


Fig. 3—This sketch clearly illustrates eight examples of swaging work performed on welded steel tubing: (1) Tapered tube made without mandrel—wall thickness increased; (2) Tapered tube made with mandrel—wall thickness controlled; (3) Straight taper with or

without mandrel; (4) Special formed tapers made without mandrel; (5) Special swaged form made without mandrel; (6) Telescoping connection through reducing and sizing; (7) Roll-beaded connection; (8) Pointing—mandrel is required for handling light tubing.





Fig. 4—Swaging elbow ends over mandrel. Ring gage for checking for size and roundness is readily visible on top of the housing.

**"Usual practice is to hand-feed the tube . . ."**

the rotation of the roll cage (E).

**Reducing dies have a flared or tapered entrance** large enough to permit entry of the un-reduced work-piece. Most of the operation is done by the bottom area of the die cavity; the matched dies possess what is known as "ovality." Figure 2 shows the grinding setup and corner relief.

Usual practice is to hand-feed the tube into the die. Because the dies rotate, there must be frictional resistance to prevent the work from rotating at spindle speed. The operator with his gloved hands can best regulate resistance to rotation, although sometimes mechanical means are used. Ordinarily about 1 inch per second is the top feeding speed.

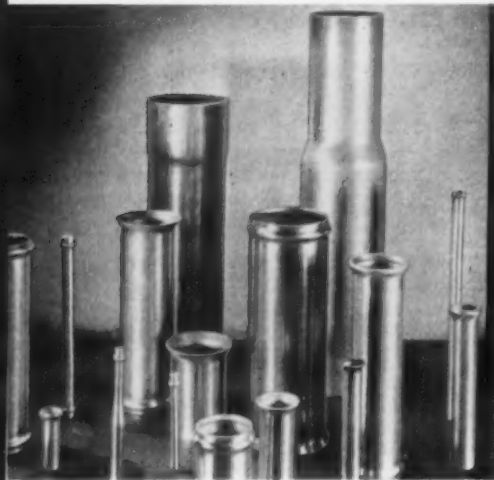


Fig. 5—This illustration shows a wide variety of welded steel tube-ends that were produced on separate tube-end forming machines.

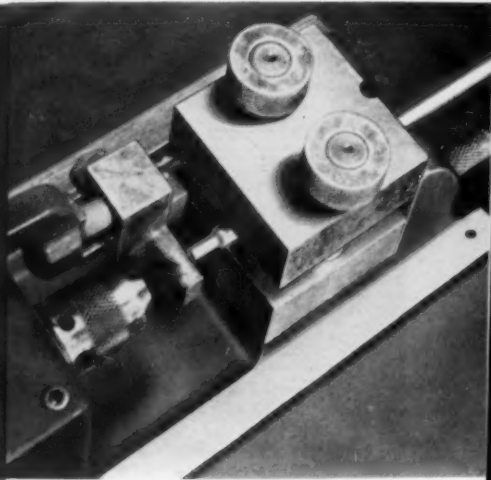


Fig. 6—The machine shown herewith utilizes an air-operated ram and clamp for the purpose of performing tube reduction operations.



## WHERE TO USE MANDRELS

When swaging, the tube wall tends to thicken as it is reduced. The hole becomes somewhat rough and non-uniform in diameter. To counteract this condition, hardened steel mandrels are often held inside the tube during swaging to provide for a smooth, round, accurate hole. The mandrel is also used for "sizing" inside and outside of tube ends.

Eight examples of swaging work on tubing are shown in Fig. 3. In Fig. 4, an operator is shown swaging elbow ends over a mandrel. A ring gage for the purpose of checking size and roundness is located on top of the housing.

## TUBE-END FORMING MACHINES

Special mass production machines are used to perform a wide variety

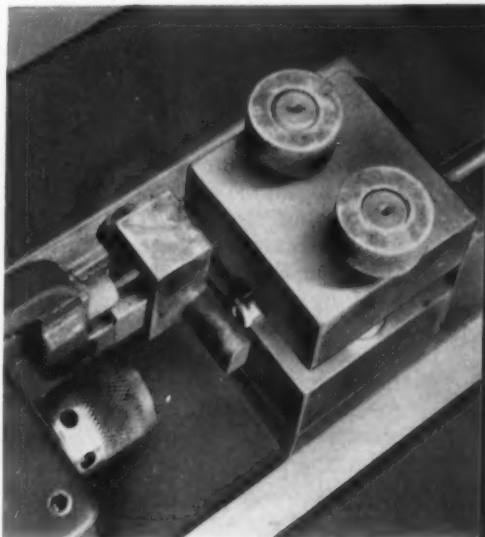


Fig. 8—The same machine that is used for performing tube reduction operations "doubles" in offset-bending the end of a tube.

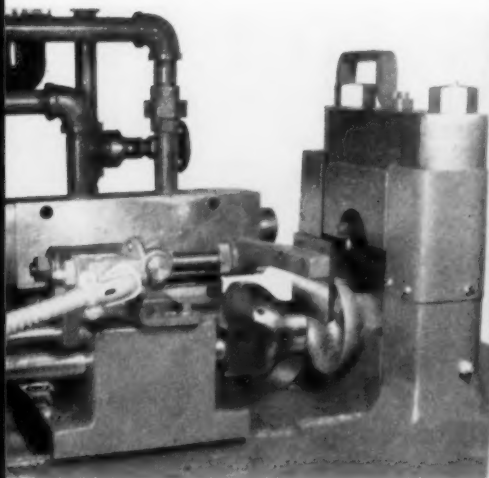


Fig. 7—This illustration shows a machine setup which is particularly designed for use in flaring the end of a welded steel tube.

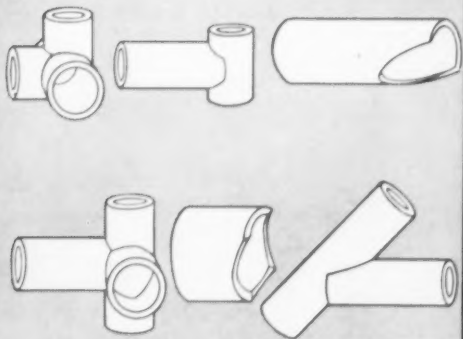


Fig. 9—Drawing showing how tube-ends can be notched for producing such parts as tee joints, multiple joints, and angle joints.



*"Dies and tube clamps can be changed quickly to adapt the machines to different operations."*

of tube-end operations. Among these are inside and outside beads, flares and flanges, expansions, reductions, double lap flares and flanges, and combinations of these shapes, as shown in Fig. 5.

Many operations once performed with swagers and punch presses are now performed on tube-end forming machines of air, hydraulically and mechanically-operated design, as shown in Figs. 6, 7 and 8. Dies and tube clamps can be changed quickly

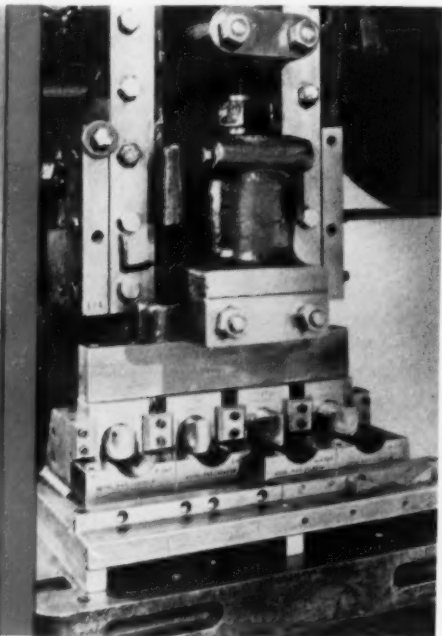
to adapt the machines to different operations.

## **PUNCHING AND NOTCHING**

So many different round, square, rectangular and other shaped holes can be punched in a tube that each case usually is a die-maker's problem. Notching tube-ends for such parts as brazed or welded tee, multiple and angle joints (Fig. 9) in bicycles, tubular furniture, hand



**Fig. 10**—This hand notcher notches one side of tube; the tube is rotated 180 degrees and operation repeated on other side of the tube.



**Fig. 11**—Notching dies for power press operation. This setup produces a complicated tube-end in five consecutive press strokes.



railings, ornamental iron work, and scaffolding is readily done on hand or power presses. Ready-made dies, as shown in Figs. 10 and 11, may be obtained for almost any size tube.

Each die is made for one size of tubing. An angle or bevel joint is made by notching one side of the tube with one size punch and die and the other side with a second punch and die. When a sequence of operations is required, punch assemblies are mounted on the same press.

### DRILLING

No special precautions are needed to drill welded steel tubing. Drill

jigs made of V-blocks with centered drill bushing attached, such as shown in Fig. 12, will handle a range of tubing sizes. These are easily made and prevent off-center drilling and drill breakage.

*(To be continued in next month's issue)*

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on any product mentioned  
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Fig. 12 — This illustration shows a setup for drilling welded steel tube on a gang type drill press. V-block drill jigs and

separate clamps are utilized for the purpose of holding the welded steel tube firmly down during the drilling operation.



# Unique Press Applications

***Multipresses are used to straighten valve rocker shafts; also, to press-fit wrist pins into holes in pistons.***

By ROBERT I. SHORE  
Managing Editor

**At the Cadillac Motor Car Division** of General Motors Corporation in Detroit, Denison Multipresses are used in two specialized applications to speed production. In one department, a Multipress is employed to straighten valve rocker shafts. These shafts are made of ordinary steel tubing of 0.828 to 0.838 o.d. and 0-

437 i.d., with a wall thickness of approximately 3/16 inch. They are 17 1/4 inches long.

After the shafts arrive at Cadillac from the supplier, they are carburized and shot blasted. During the carburizing, they are loaded upright in baskets, about 400 to a basket. This heat treatment quite often results in distortion, sometimes definitely severe, for shafts which are stacked in the outer areas. All shafts go to a Denison Multipress which is employed both to check for straightness and to correct any irregularities.

An operator takes each shaft in turn and places it in a fixture mounted on the bed of the press, so set up that it can be moved laterally under the ram. The fixture is built with pairs of rollers at each end, so that the shaft can be rotated manually; this is done after a feeler gaging operation and under the ram, which is then brought down under pressure of about 1,500 p.s.i. for straightening the shaft.

**These shafts must be held within 0.0010 inch** of exact straightness to be ready for the next operation—milling of oil grooves into them. Inasmuch as these oil grooves must be held with the same 0.0010-inch tol-



*Straightening valve rocker shafts at Cadillac.*



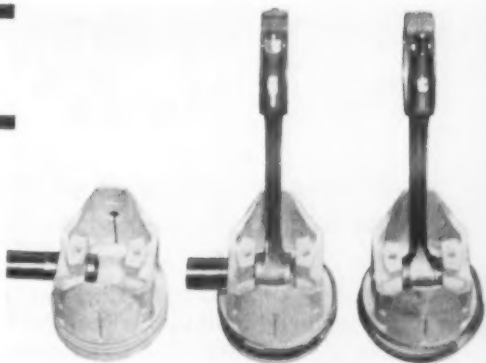
## at Cadillac

erance for depth, a high degree of accuracy is required for the straightening operation; and fast production is also an essential.

In another department at Cadillac, a Denison Multipress is used on a piston line to press fit the wrist pin into the wrist pin hole of the piston. The piston comes down a conveyor after induction coil heating at a temperature between 350 and 400 deg. F. to a station where an operator runs the Multipress. The heater coil operator has already dropped the wrist pin into position for press fitting. This wrist pin has a diameter of approximately 1 inch, and its hole is about 2-1/32 inches wide. It is case-hardened to a range between 60 and 64 on the Rockwell C scale.

**About 1,500 p.s.i. pressure is required for press fitting** of the pin. The induction heating beforehand makes this possible; if the pieces were cold, a pressure of over 2,000 p.s.i. would be required. The press used in this operation is fitted with an automatic gage, whose function is to check the proper pressure required to move the pin into its proper position. If the proper pressure is required a green light goes on and the operator moves the assembly back onto the conveyor line. If, however, the pressure is inadequate, a bell rings and the piece is put to one side.

Line speed of this operation and others on same job results in production of about 360 units per hour.



*Close-up view of Cadillac piston section, showing function of wrist pin inserted by Denison Multipress. At left is piston head with pin slipped in the hole, protruding to the left. Center view shows piston connecting rod in place, with the pin further into the hole. At the right is the completed assembly, with the wrist pin driven all the way in, thereby affording the rod a shaft on which to rock.*



*Press fitting of wrist pins in pistons.*



# Gaging Automobile Push Rods

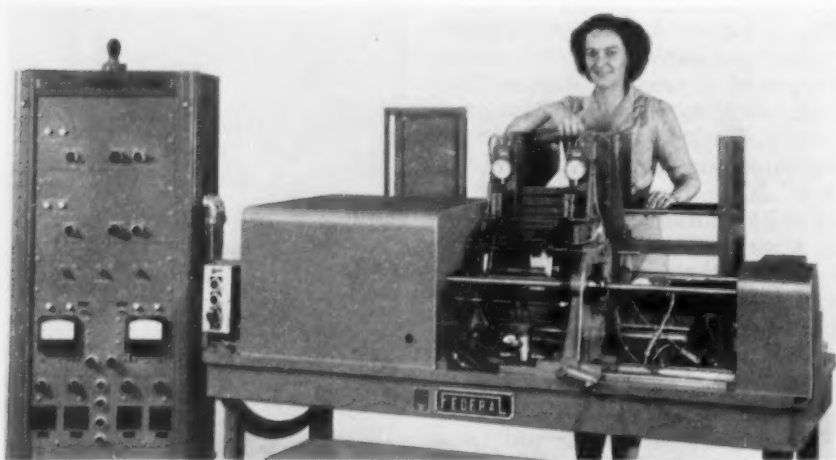
***Automatic sorting gage fits into production line to provide inprocess dimensional control.***

**A fully-automatic sorting gage** designed and built by Federal Products Corporation of Providence, Rhode Island, is an integral part of the production line of a leading automotive equipment manufacturer. This conveyor-fed gage measures six conditions on automobile push rods.

Federal Electricator gaging units and reluctance hardness testers check the push-rods for o.d. and hardness at both ends, overall length and straightness. The parts are sorted into three categories—Good, Salvage and Scrap—automatically at a rate of 2,500 per hour. The good

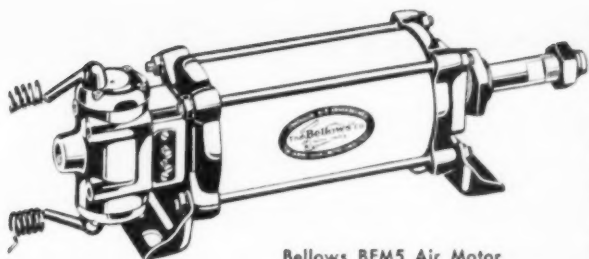
parts are fed to a conveyor to continue to the next process, while the scrap and salvage parts are sorted into bins out of the production line.

To give the manufacturer maximum control over the various processes, percentage counters have been provided at each gaging station. When the number of rejects at any station exceeds the allowable limit, the gage flashes signal lights and operates relays to shut off the offending process machine previous to the gage. This system controls the amount of scrap so that it can never become a profit stealing factor.



*Setup used by leading automotive equipment manufacturer for gaging automobile push-rods.*





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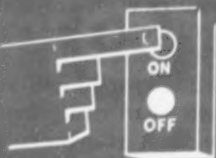
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IT TAKES  
LESS SPACE



ITS ACTION  
IS FASTER



IT IS EASIER  
TO CONTROL



# High Speed Drilling of Camera Parts

***Camera manufacturer solves machining problem by designing own production machinery.***

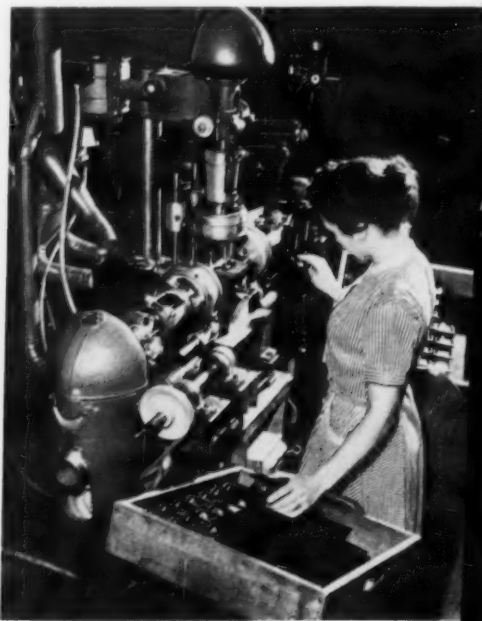
**Precision machining camera bodies and a flash attachment** posed a problem in engineering economics for Whitehouse Products, Inc., Brooklyn, N. Y. Production requirements were sufficiently large to rule out single drilling of the complex components, but not enough to warrant investment in special machines.

Whitehouse technicians solved the problems by designing and building their own production machinery. Consisting of nine 14-inch high speed Delta drill press heads in a multiple-unit arrangement, the drilling setup planned can be operated individually or collectively.

Machining the flash attachment, as shown in the accompanying illustration, calls for three Delta drill press heads to drill eight holes and perform a deburring operation at the same time. Two opposed horizontal drill press heads equipped with three spindles each are used to drill electrical contact and hinge holes in the sides of the unit. At the same time a vertically-mounted two-spindle drill press head drills two holes through the flash attachment fastener while it deburrs a 1¼-inch reflector hole in the flash housing. Production rate is 600 pieces per hour.

In machining the camera bodies, one unit made up of four drill press

heads drills sixteen holes simultaneously at a rate of 300 pieces per hour. The other unit, used for operations on the back cover of the camera, consists of two drill press heads that automatically drill five holes simultaneously. The production rate for this particular machining sequence is 450 pieces an hour.



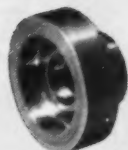
***Drilling eight holes in the flash attachment using three Delta drill press heads.***



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SAE 4130

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Tests have proved that new Sunicut 5534 meets this demand for an all-purpose cutting oil. It is ideal for general screw machine and turret lathe work. It is also excellent for tapping, drilling, threading, and light stamping operations. In addition, new Sunicut 5534 can be used on many special machining jobs, both high and low speed, with metals ranging from B1112 to

4130 as well as free-machining stainless steels.

For complete information about new Sunicut 5534 and how it can help you reduce your oil inventories...lower your production costs...see your Sun representative. Or write SUN OIL COMPANY, Phila. 3, Pa., Dept. MM-12.



INDUSTRIAL PRODUCTS DEPARTMENT

**SUN OIL COMPANY, PHILADELPHIA 3, PA.**

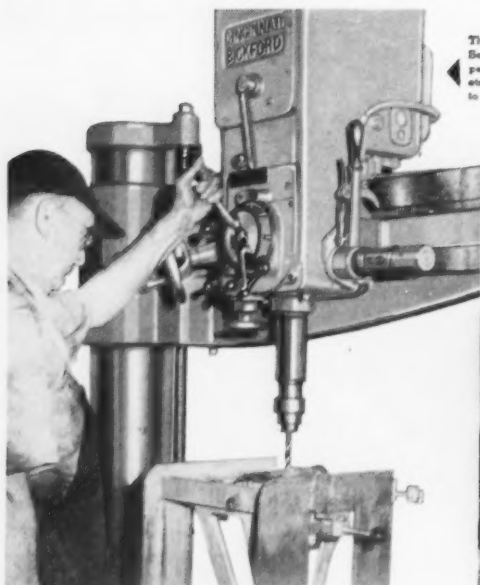
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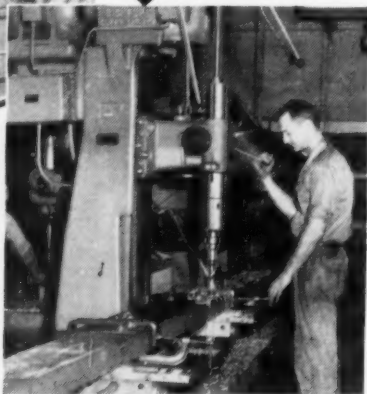
modern machine shop 137





The 9' dia. column 3 arm Cincinnati Super Service Radial is working on chassis frame parts and aluminum steering column brackets;  $\frac{1}{4}$ " dia. to  $1\frac{1}{4}$ " holes drilled and reamed to a .0018" tolerance.

The Upright Drill shown is one of six 26" Super Service Uprights working on heat treated alloy steel frames.



**Money-making**  
**Cincinnati Bickford machines**  
 ... at The Autocar Division, WHITE MOTOR CO.  
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Photos courtesy the Autocar Division of The White Motor Company, Easton, Pennsylvania.

Speed and easy handling—power and accurate, steady performance were factors in the selection of Cincinnati Bickford Super Service Radial and Upright Drills in this plant. They are quickly adaptable to a variety of operations, including drilling, reaming, tapping and trepanning.

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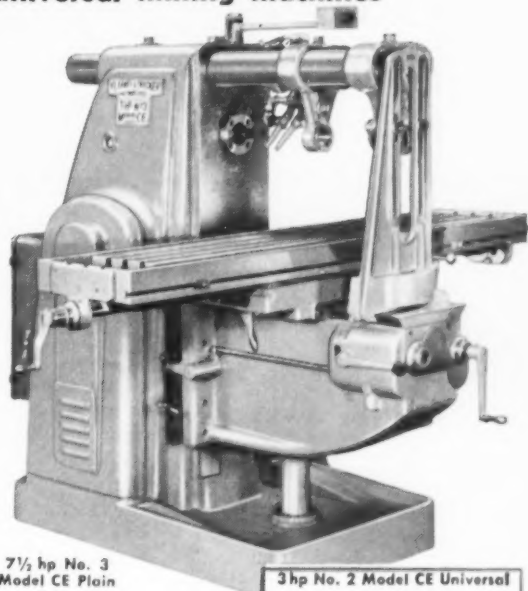
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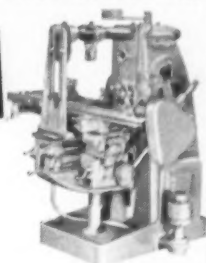


**7½ hp No. 3  
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NOTE: Standard equipment includes choice of only one arbor support. Overarm brace available at additional cost.

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## **Kearney & Trecker Corp.**

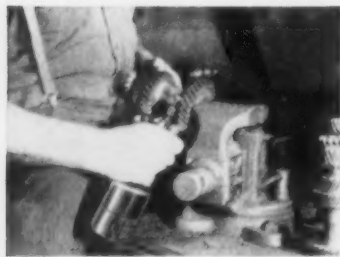
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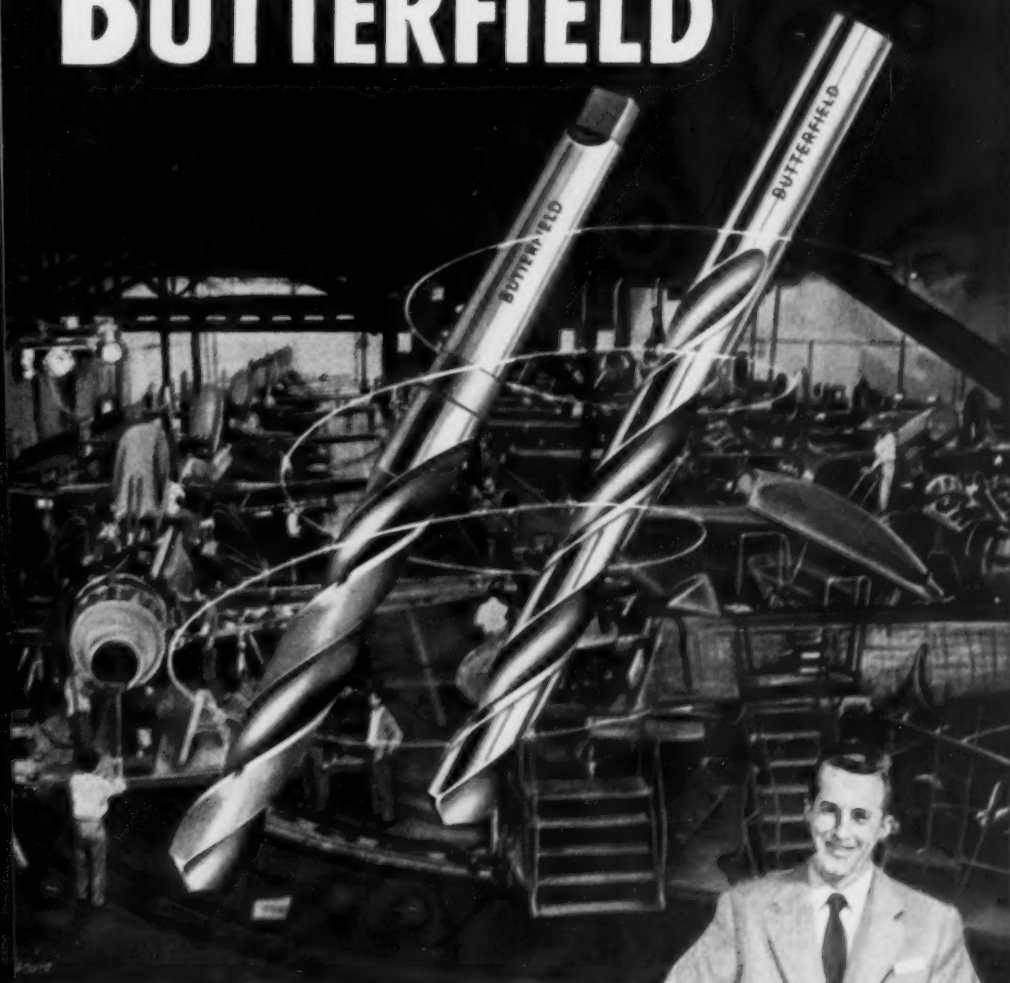
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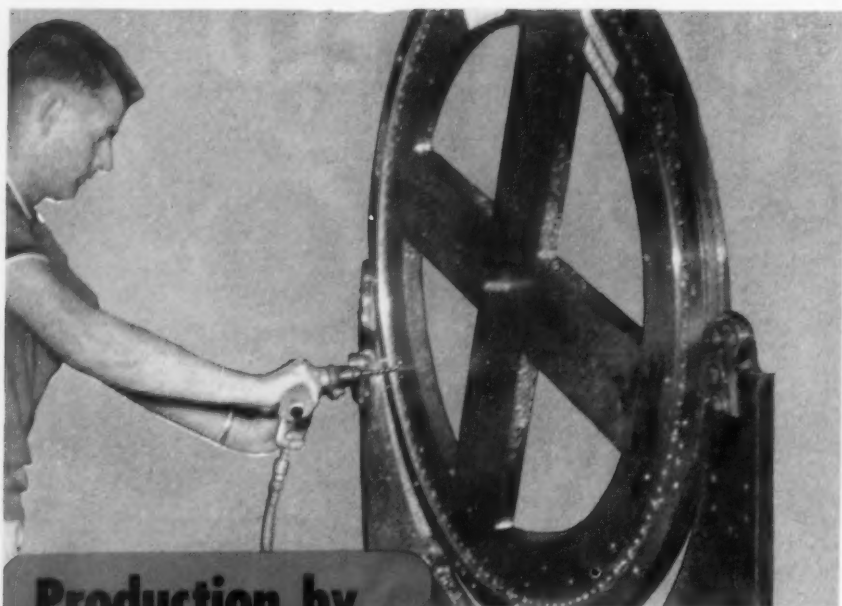
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## Production by Compressed Air

By EDMOND C. POWERS  
Educational Director, Compressed Air  
and Gas Institute

### ***Aircraft parts subcontractor finds compressed air a versatile aid in solving production problems.***

**Frequent change in its products** is likely to be the rule for a subcontractor manufacturer. In order to attain the high degree of flexibility required for profitable operations, many such manufacturers are finding compressed air a dependable and versatile aid in solving new production problems.

For a typical example of this, con-

sider the operations at the Tyce Engineering Company of Chula Vista, California. Within the past six years, this subcontractor on aircraft parts has increased its use of compressed air almost tenfold within its integrated plant for producing a wide range of parts. Some of the applications of compressed air are mentioned in the following paragraphs to illustrate

(Above) Fig. 1—Drilling 120 holes in this aluminum flange was simplified by means of the fixture shown here. The lightweight flange is

easily placed over the fixture, which has a mounting for an air-operated drill and which positions the flange for each drilled hole.



## Compressed air may be the answer to your production problem!

the benefits the company gained from the increased use of this versatile power.

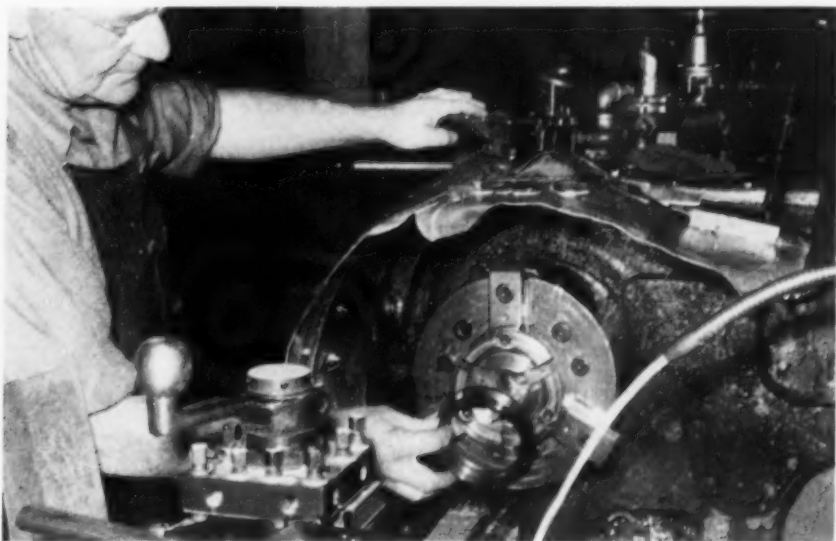
Drilling 120 holes in a 4-foot diameter aluminum flange (Fig. 1) was one of the production problems effectively solved with the aid of compressed air. A wheel-like fixture holds the flange vertically. There is a mounting for a pneumatic drill and, as the fixture is turned, it positions the flange for each drilled hole.

Another entirely different application for compressed air is for the fast operation of air hammers for hot forging.

Less than a year ago Tyce Engi-

neering equipped all of its turret lathes with air chucks. As a result, substantial gains were made in productivity from the time saved in loading and unloading the machines. These were more marked, of course, where the time of the cut required frequent loading. With one hand on the chuck operating lever and the part in the other hand (Fig. 2), loading is effected almost instantaneously. The air chucks can be well protected, which also saves time in cleaning out chips.

**Another manual operation which has been replaced by air** is the hand-rubbing of machined forgings



**Fig. 2—Air chucks installed on all turret lathes at Tyce Engineering Company have increased productivity. With one hand of the operator**

**on the air lever and the other hand holding the part, the machine can be quickly and easily loaded or unloaded as required.**



**"Finishing operations . . . also are improved by the use of high-speed air grinders."**

which require a complete finish. For instance, an aluminum landing gear fitting for a certain airliner requires a 40 finish for every surface. The tedious hand rubbing has been replaced by an air-operated vibrator to cut that time-consuming job in half (Fig. 3).

The air vibrator, which rapidly moves the emery cloth back and forth with much the same action as a rivet gun turned sideways, not only effected substantial reductions in the total machining time for the fittings, but also reduced worker fatigue on a patience-trying job.

Finishing operations, including those for the landing gear fitting mentioned above, also are improved by the use of high-speed air grinders. These grinders operate cones of tightly-wrapped emery cloth at speeds of up to 20,000 revolutions per minute, which are necessary to obtain the finish desired.

It has been mentioned that Tyce Engineering Company is a contract plant. However, it is developing one product of its own and that, interestingly enough, is in connection with air rivet guns. Successful tests have been made so far in a number of aircraft plants.

**The product is a nose which fits any standard rivet gun.** Its purpose is to prevent rivet heads from forming until metal has tightly filled the hole. This assures air and gas-tight construction, adds to the strength of the structure and minimizes shearing action. These results

are obtained by the inside of the nose moving back when shoved over the rivet while the outside stays flush and the inner piston goes to work on the rivet. In this way, the rivet is expanded in the hole.

In addition to the applications which have been mentioned, Tyce Engineering uses compressed air for sandblasting, air hoists, vises and other air cylinder operations by having ample air compressor capacity and properly sized distribution lines. The principal units providing compressed air are two single-stage horizontal compressors, each having about 500 cubic feet per minute ca-



**Fig. 3—The air-operated vibrator shown herewith reduced the complete finishing time for a landing gear fitting by one half.**





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**"There's been a tenfold increase in use of air . . ."**

capacity at 100 pounds per square inch pressure. Also, there are three smaller units with a total capacity of about 100 cubic feet per minute, which serve as standby power. It was

only six years ago that the present standby compressors represented total output. There has been a tenfold increase in the use of air since then.

**In order to reduce friction loss to a minimum**, distribution lines are amply sized. Also, in addition to the receiver at the central compressor plant, another receiver has been

installed at the opposite side of the plant to help maintain even pressure when there are heavy demands on the system. These simple precautions for preventing pressure drop make important contributions to productivity by keeping air tools and equipment at peak efficiency.

By recognizing the profit possibilities in the proper uses for compressed air and by having this power ready where and when needed, Tyce Engineering Company has scored production gains which are very impressive in the aggregate.

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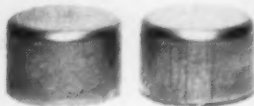


## 7 benefits received by switch to **STANOSTAMP Compound C**

Jagemann Stamping Company, Manitowoc, Wisconsin, benefited seven ways by switching to STANOSTAMP Compound C. Finished ferrules drawn from 19 gauge cold roll steel were being badly scored. At the same time dies were being scratched and excessive heat experienced in the press. Standard lubrication specialist R.E.O'Brien suggested STANOSTAMP. The result:

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**Air hose ferrules. One at right produced before switch to STANOSTAMP, one at left produced after conversion to this forming compound. Scoring of dies as well as work occurred before switch.**



Father and son inspect ferrules. William P. Jagemann (left), President, and son William T. Jagemann note improved finish on work using STANOSTAMP.

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(Indiana)





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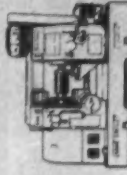
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- Use Namco micrometer gage to check and set chasers or cutters during resharpening. No time-wasting trial cuts required.
- Standard Vers-o-tools are made in revolving Style DR and non-revolving Style DS for diameters .036" to 6 1/2"; Style DBS for BSA and Brown & Sharpe automatics.



# Grinding **COLOR TV**

***Automatic three-stage grinder provides answer to manufacturing problem at RCA.***

**Like all progressive American manufacturers,** Radio Corporation of America continually strives to price its products to attract the American mass market and like all manufacturers its prices depend on the efficiency of its manufacturing methods. Special machine tools are the means that RCA frequently uses to achieve such efficiency. One of the

current projects at RCA is a special deflecting yoke for use in RCA color receivers. Here again a special machine tool provided the answer to a manufacturing problem.

The deflecting yoke is made up of four coils with a core molded from a special ferrite mix process similar to the powdered metal process used in industry for many years. After molding, sintering takes place. The parts are fired at high temperatures and are said to become hard enough to cut glass.

**To obtain maximum efficiency from these cores,** it is necessary to form the eight mating surfaces between the four segments very accurately to produce an exact cylinder. Extremely accurate grinding, therefore, is required on both ends of each segment to produce a smooth surface and true 90-degree mating ends. RCA has been accomplishing this operation on yokes for its black-and-white receivers using special machinery heretofore engineered and constructed in its own plant. The color core presented a problem in physical size and because RCA's own Equipment Development Section was overloaded, The DoAll Company was called in. This company in conjunction with RCA agreed on a machine design to handle the yoke segments and proceed-



Side view of the special DoAll grinder for color TV deflection yoke segments, showing the twin-spindle three-station design.



# Deflecting Yokes

ed to build the machine for the Radio Corporation of America.

This machine performs the following operations: (1) automatically loads the part, aligns it, grinds it, and discharges it; (2) grinds both ends of the segment simultaneously; (3) automatically takes the segment down to the desired dimension, finish, and flatness in three fast, successive grinds (finish, 16 micro inches RMS; flatness within 20 millionths across entire surface); and (4) maintains the planes of the ground ends at 90 degrees to each other within 50 micro inches over the  $\frac{7}{8}$ -inch end width and does this while producing the pieces at a rate of one piece every three seconds.

**To use the machine,** segments, molded of powdered ferrite, are stacked in a vertical hopper, ends facing out from the machine. A hydraulic loader at the base of the hopper pushes the bottommost segment into a fixture, one of 36 mounted on the periphery of a large motorized 48-inch diameter wheel called the "index wheel." Upon seating the segment, the loader also pushes a lever that causes the fixture to clamp the segment securely in place.

When a part has been loaded, the wheel indexes 10 degrees, moving the loaded fixture toward the first pair of grinding spindles and the next empty fixture up to the loader. The workpieces are carried through



*Segments of the deflection yoke must fit together perfectly, as shown in this illustration, to assure an efficient magnetic circuit.*

three grinding stations. At each station, the index wheel stops and is accurately positioned by a hydraulic actuated locking pin. After the index wheel is securely locked, twin grinding spindles, moving hydraulically on hand-scraped ways, carry diamond cup grinding wheels across the segment faces. At the first station, all but 0.035 inch is removed; at the second, 0.025 inch more, and at the third station the final 0.010 inch of stock is removed to bring the piece to size and to generate an extremely smooth surface flat and square to 20 millionths.

**After completing their pass, the grinding spindles withdraw** to starting position, the index wheel rotates through 10 degrees, and the loader seats another segment in an empty fixture while the spindles advance again on a grinding pass toward the adjacent fixture. The work-





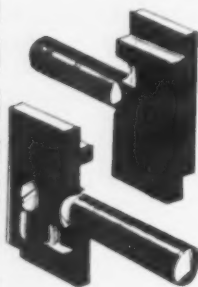
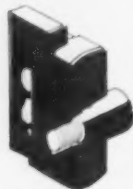
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$\frac{1}{8}$ " x  $\frac{7}{8}$ "     $\frac{1}{8}$ " x  $1\frac{1}{8}$ "  
 $\frac{1}{2}$ " x 1"     $\frac{1}{8}$ " x  $1\frac{1}{2}$ "

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piece is carried past the final position where an automatic ejector drops it to a conveyor which carries it away from the machine.

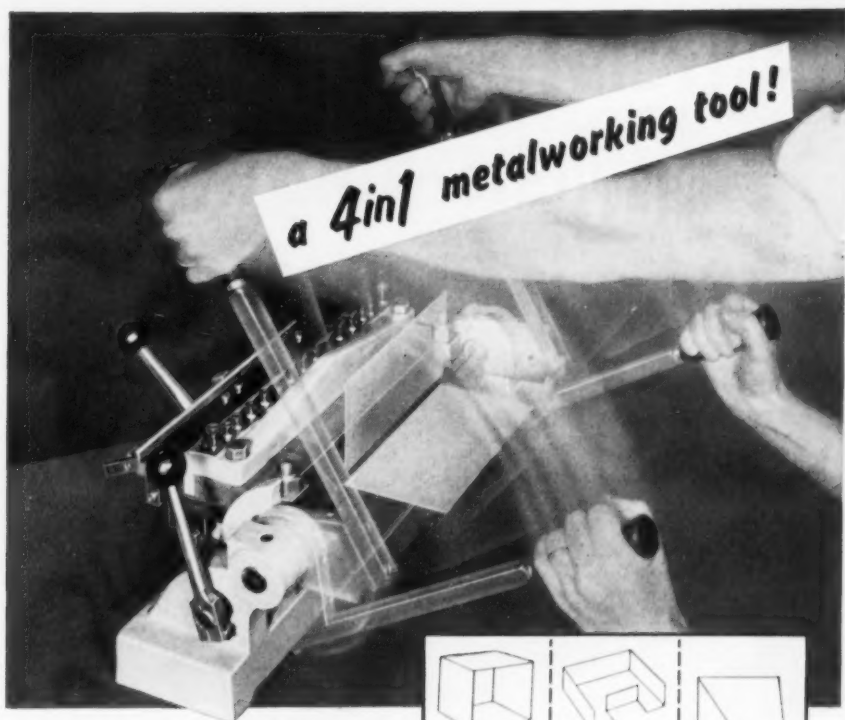
★ ★ ★

**Electronic Data Processing in Industry: A Case Book of Management Experience.** Published by the American Management Association, 330 W. 42nd St., New York 36, N. Y. Special Report No. 3. 256 pages. Illustrated. Board covers. Price, \$7.75 (AMA members \$5.75).

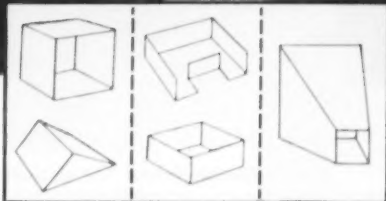
Years of man hours and millions of dollars are currently being invested in electronic data-processing systems by pioneer firms. These and other companies are assembling answers to questions about management experience with electronic data-processing. This publication is a comprehensive report to management on the latest developments in "the office revolution." This timely volume describes graphically how automatic data-processing offers unparalleled speed, accuracy, controls and savings for industry. It gives specific, practical information on how to determine whether a company should adopt electronic data-processing; how to plan the installation of an electronic data-processing system; what automatic data-processing equipment is available; how progressive companies are now using electronic data-processing in such specific fields as customer and general accounting, production planning and labor budgeting, materials handling and many others. Also included are reports of company experience with small, medium and large computers.

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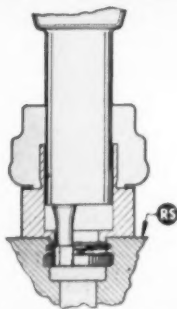
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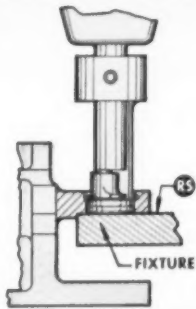
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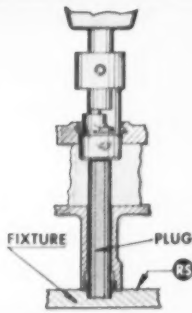
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B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.



C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.

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**FOUR time-saving suggestions for the man  
in the shop.**

# **Collet-Type Work- Holding Fixture**

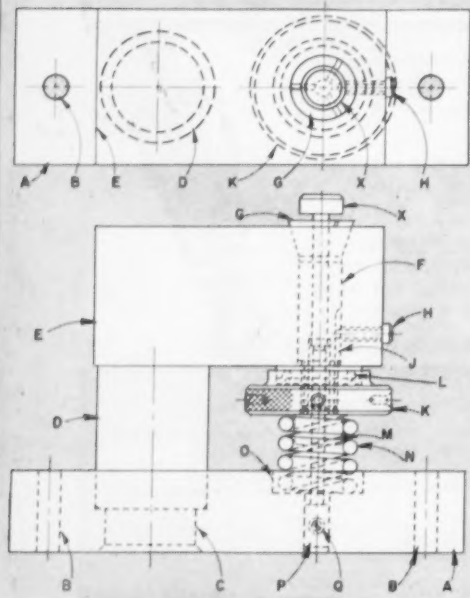
By W. M. HALLIDAY

**The simple fixture shown in the  
accompanying sketch is designed  
for holding small cylindrical parts,**

such as pins, studs, or rods, that are to be slotted across the end faces; for holding parts which are to be machined with one or more flats across the sides to produce some regular polygonal shape; or for holding workpieces which are to be drilled in the ends in an absolutely concentric manner. The fixture consists of a rectangular base plate, *A*, of mild steel or cast iron which is accurately ground on the top and bottom surfaces. Two holddown holes, *B*, are provided near the ends of the base plate for use in fastening the fixture in place on the machine table.

Centrally located in the base plate *A* at a point near one end is a large counterbored hole, *C*, into which is tightly pressed-fitted the cylindrical member *D* formed integrally on the underside of the fixture body *E*. The member *D* is firmly riveted to the base plate *A*, as shown.

Situated near the right-hand end of the jig body *E* is an accurately bored hole, *F*, whose axis is perpendicular to the base plate *A* and into which is fitted a standard split collet, *G*. The upper end of the hole is machined conical to accommodate the collet head. The thickness of the body *E* is approximately  $\frac{5}{8}$  inch



*Sketch of collet-type work-holding fixture for machining ends of cylindrical workpieces.*



less than the overall length of the collet so that the threaded end of the latter projects below the underside of the body *E*. The collet is restrained against rotation by means of a screw, *H*, located in a hole provided in the front of the body *E*. The tip of the screw *H* is a sliding fit within the keyway *J* provided in the collet *G*, which is arranged to slide freely in the hole *F*.

The collet *G* is adjusted by means of a large diameter knurled nut, *K*, which is screwed onto the threaded end of the collet. The side of the nut adjacent to the underside of the body *E* is recessed to accommodate a ball thrust bearing, *L*, which is intended to reduce friction. The opposite side of the nut has an integral extension, *M*, which is encircled by a light coil spring, *N*. The lower end of this spring seats within a shallow recess, *O*, provided in the top of the base plate *A*. The purpose of the spring is to force the nut *K* and the collet *G* upward when the nut is loosened so as to provide for quick release of the workpiece *X*.

A hole is drilled through the base plate *A* exactly in line with the hole *F* in the jig body *E* to accommodate a stop pin, *P*. The workpiece *X* rests on the upper end of the pin *P* which locates the workpiece the desired distance out of the collet *G* as shown. The stop pin is adjustable in height within certain limits and is fastened in place by means of a headless locking screw, *Q*, passing through the side of the plate *A*.

The sketch shows a headed stud mounted in place in the fixture preparatory to milling a slot centrally across the head. After the part has been mounted in place, it is quickly

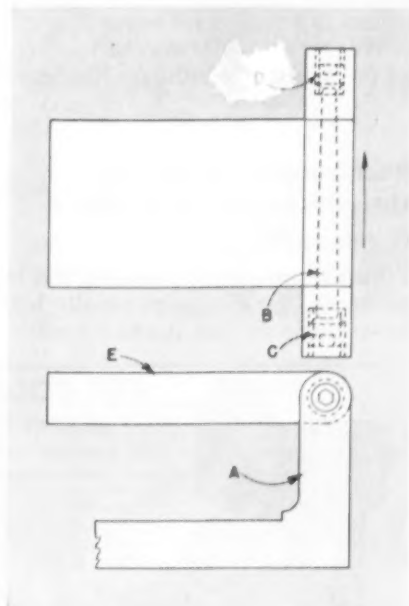
locked in position by turning the nut *K* in the proper direction to draw the collet *G* into the body *E*. Final locking pressure is imparted by inserting a tommy pin in the holes provided around the periphery of the nut for that purpose. To remove a collet, the nut *K* is unscrewed from the threaded end of the collet, which can then be pulled up out of the jig body *E*.

★ ★ ★

## Taper Pin Adjusting Arrangement

By F. C. ELMO

Where the bushing plate on a drill jig is subject to excessive use, the hole that houses the tapered pi-



Sketch of a drill jig in which a taper pin adjusting arrangement is employed.



## ideas from readers . . .

vot pin eventually wears oversize. This condition affects the accuracy of the jig and, therefore, has to be corrected. The accompanying sketch shows an arrangement for effecting such a correction. The holes in the jig body, *A*, for the taper pin, *B*, are each tapped at one end to accommodate two set screws, *C* and *D*. When excessive play occurs in the bushing plate *E*, the pin *B* is moved in the direction indicated by the arrow by turning the set screw *C*. The assembly is locked by set screw *D* after the proper adjustment has been made. If the plate *E* is too tight and will not move freely, the pin can be retracted by the use of set screw *D* and locked in place by set screw *C*.

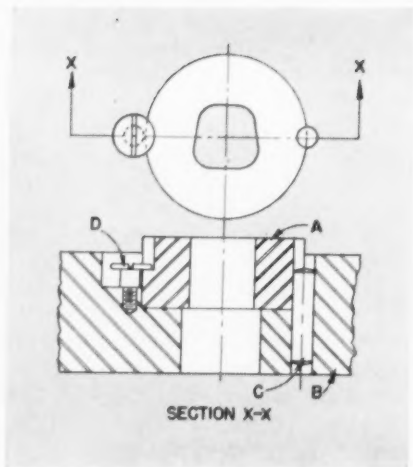
This arrangement may be employed for many taper pin applications.

★ ★ ★

## Removable Insert for Universal Piercing Die

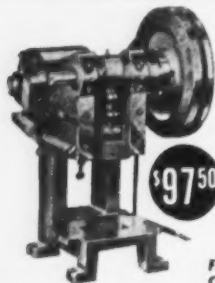
By CLIFF BOSSMANN

When a universal piercing die is produced, the die insert usually has to be made so that it can be easily



Sketch of a removable type of insert designed for use in a universal piercing die.

removed from the die shoe and another one put in its place. The accompanying sketch clearly shows how such an arrangement can be effected. The insert, *A*, is made round, thus enabling the retaining cavity for the insert to be accurately bored in the die shoe, *B*. The insert is prevented from moving radially by a single dowel pin, *C*, and is held in the cavity by a lock screw, *D*, which can be quickly removed to allow for ready changing of the insert.



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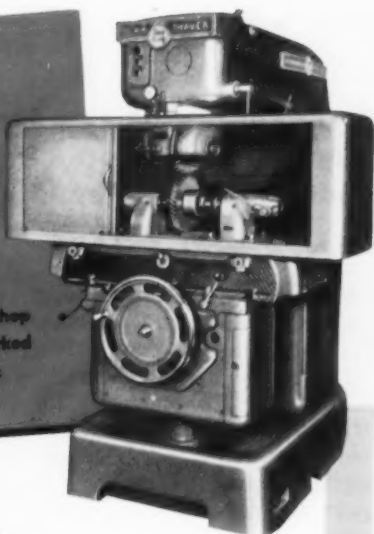
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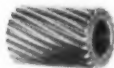
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## Modified Micrometer for Measuring Staggered Tooth Milling Cutters

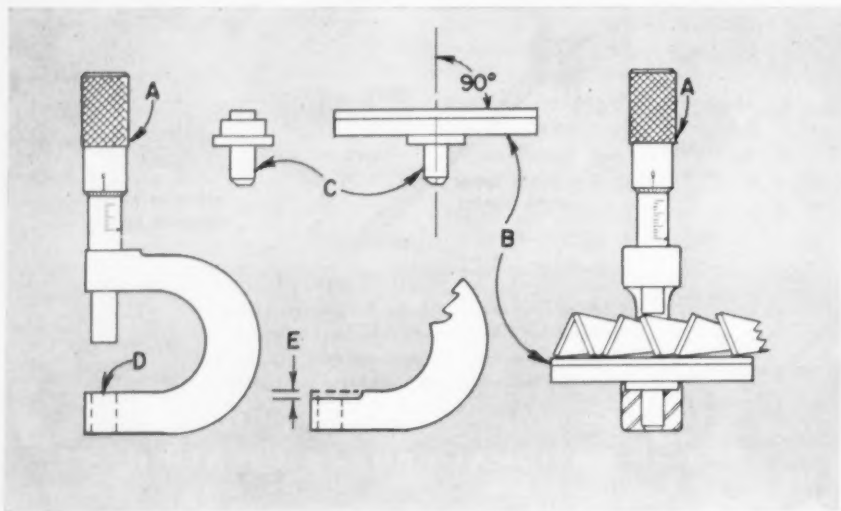
By H. J. GERBER

In our shop, we have found very useful a micrometer which has been adapted for measuring the width of staggered tooth milling cutters. Since it is necessary for us to frequently make measurements of this type, we discovered that it was quite inconvenient to use a standard micrometer and a parallel as are frequently used for this particular purpose.

In adapting the micrometer for measuring the width of staggered tooth milling cutters, we found it

necessary to replace the lower anvil on the standard C-frame micrometer, shown at *A* in the accompanying sketch, with a bar type anvil, *B*, having a length of approximately  $1\frac{3}{4}$  inches. This anvil is made with an integral stud, *C*, which is press-fitted into the hole, *D*, which was normally used for the purpose of holding the standard anvil in position on the micrometer.

The bar type anvil *B* is made of tool steel which is hardened to approximately 60 Rockwell *C*, and precision ground on the top or gaging surface so as to be absolutely square with the integral stud *C*. Due to the fact that the bar anvil *B* is necessarily thicker than the original anvil used with the micrometer, it was necessary to mill out the micrometer frame an amount equal to the increased thickness, as designated at *E* in the sketch shown below.



Sketch showing the manner in which a standard C-frame micrometer can be effectively adapted for conveniently measuring the width of staggered tooth type milling cutters.



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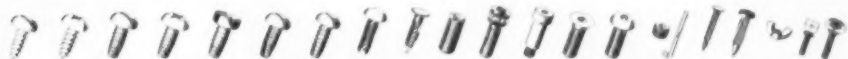
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# Guest Editorial

By DR. GEORGE S. BENSON

Director, National Education Program  
Searcy, Arkansas

**In the comedy cartoon movies,** a frequently used gag shows a dog named Fido accidentally becoming entangled in a huge mysterious-looking machine, and disappearing inside it. Automatically, out the other end of the machine comes a long string of link-sausages, or "hot dogs," with the lead sausage still barking — just like Fido had barked. This is fictional "automation." In the comedy cartoon it isn't real, of course. It isn't real in a 1955 packing house where "hot dogs" are made. Automation hasn't progressed quite that far.

There are many bugaboos about automation. It is well to be reminded that it isn't a new idea—that, indeed, "Fido" has been going through the "hot dog" sequence for 30 years at least. Some American industries have been using what's now called "automation" for at least 30 years. Important production jobs in the petroleum, auto and other industries have been handled automatically through machine control for many years. Automation is an evolutionary development — a logical outgrowth of the competitive market and the ingenuity of free men.

**When blacksmith shops began to go out of business** as the automobile replaced the horse and buggy early in this century, there were moans of alarm from many quarters. The prevailing thought among alarmists was that there would be no jobs for the people who were temporarily displaced in the wagon and buggy industry and this meant disaster.

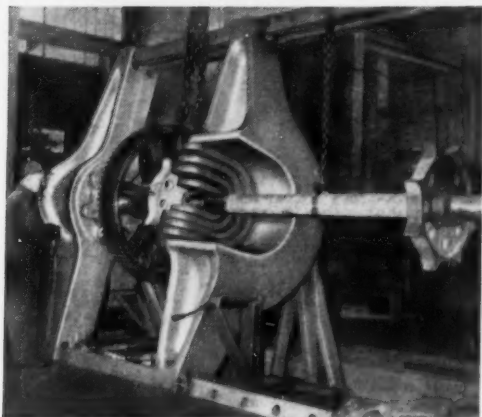
Some of today's economics textbooks state that it is questionable whether inventions are good for the nation, particularly new industrial production machines which cut down on human labor. All this seems to be rather shortsighted or even blind reasoning. The facts about the development of the automobile are available. The development made 10,000 jobs for every one which it eliminated in the wagon and buggy industry. The same is true as regards the other steps in America's technological progress.

**The fact that Americans enjoy a living standard** five times better today than a century ago can be traced to the growth of "automation," which has increased man-day production. The fact that nearly 65,000,000 Americans are employed today is a commendation for advances in "automation" during the last 20 years.

Harnessing the machine has opened almost limitless opportunities for the production of new products. Nylon would have been virtually worthless in the spinning-wheel era. Today it accounts for perhaps 100,000 good-paying jobs. Air-conditioning plants could be sold only to Sultans and Kings—if automation didn't produce units at a price within the reach of millions of home owners. Hundreds of such examples could be readily cited. The various new products designed to make living more pleasurable also make jobs more plentiful. Automation, then, could be said to be merely a new word for progress!



# A MOUNTAIN *of* POWER



**POWER FOR BIG JOBS**—Here a Rodgers 600-Ton Inclined Forcing Press is forcing a large gear and sprocket from a mine machine shaft.

## —or a touch of pressure

The heavy machines and equipment used in the great iron mining industry present a variety of problems when repair or maintenance is necessary. For this work the accurately controlled action of Rodgers Hydraulic Forcing Presses is a real time and work saver.

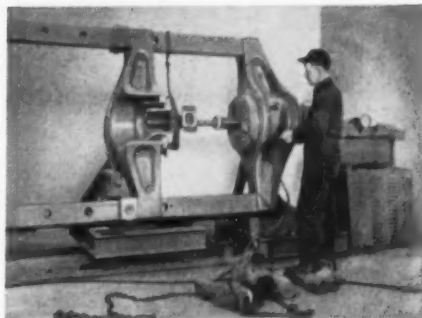
A Rodgers Forcing Press puts a mountain of power at your fingertips to force wheels, sprockets or gears from their shafts and for straightening, assembling, swedging or upsetting jobs. Operators also use the versatility, speed, power and positive control of a Rodgers Forcing Press to efficiently perform small pressing and forcing jobs with just a touch of pressure—tasks once done only on vertical shop presses!

## *you get both* with **RODGERS FORCING PRESSES**

Rodgers vertical, horizontal and inclined forcing presses offer capacities from 100 to 600 tons . . . up to 9 feet between tension bars . . . up to 16 feet between ram and abutment . . . single or double acting cylinders with 13 or 26-inch ram travel (72-inch travel available) . . . electrically powered hydraulic pumps with selective, positive pressure adjustment and remote control . . . removable press cylinders that can be used in special jacking or pulling jobs . . . and many more features that assure you of dependable, long life operation — all fully described in Rodgers Catalog Number 315A.

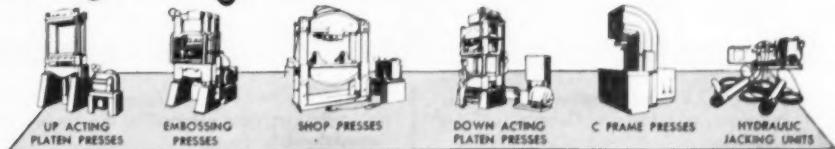


**Write for it today!**



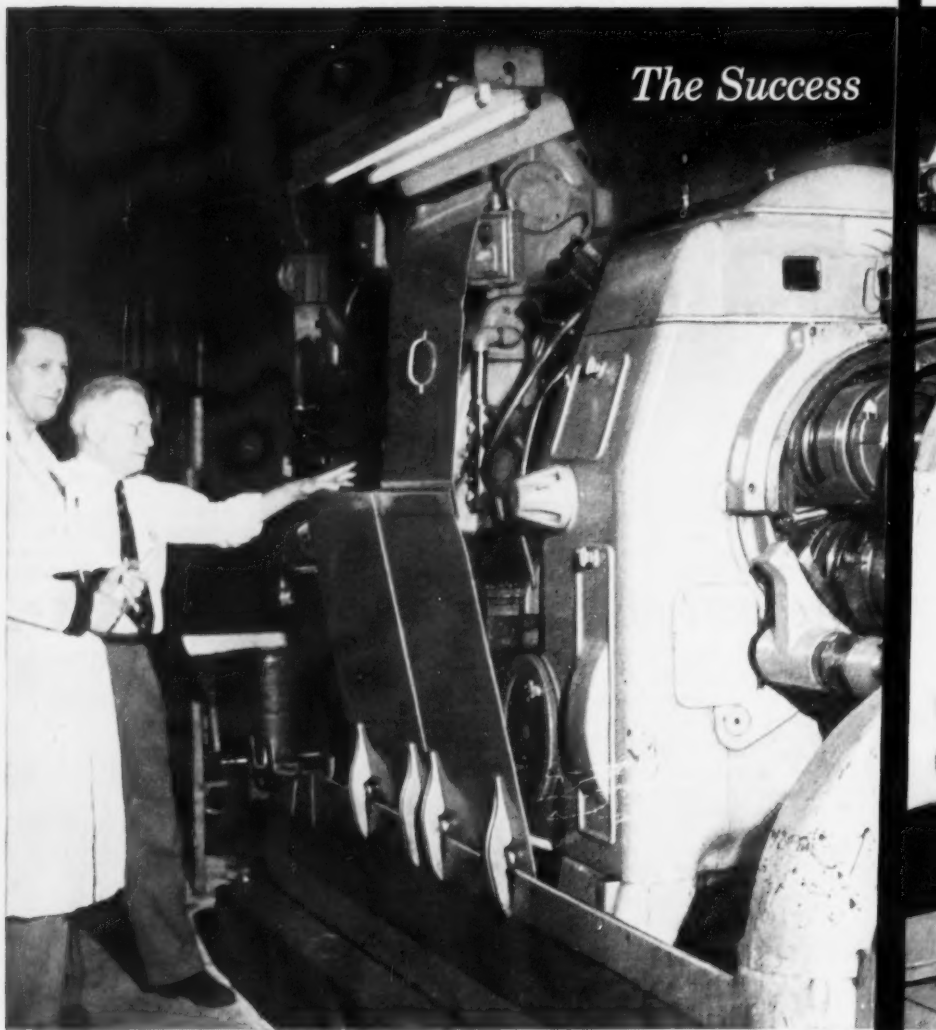
**LIGHT TOUCH FOR SMALL JOBS**—This Rodgers 300-Ton Inclined Forcing Press is used on small as well as large equipment repairs. Here, a pin is being pressed out of a tractor idler support bracket.

**Rodgers Hydraulic Inc.** 7447 Walker St., Minneapolis 16, Minn.



For more data circle 374 on Reader Service Card





*The Success*

**More than a "Coolant" is needed**

Plants in: Chicago, Detroit, Cleveland,  
Hartford, and Toronto, Ontario.

Branch Warehouses and Representatives in principal metal working centers in the United States, Canada and Europe.



ss  
Story of

# SPEEDKUT

... a boost for  
screw machine output!



*The Success of SpeedKut A . . . is an oft repeated story of increased output, better tool life and less downtime.*

SpeedKut A is a product of Stuart's sulpho-chlorination processing that provides absolute uniformity and stability. Highly effective chemical additive materials are pre-balanced under strict laboratory supervision to instill SpeedKut A with the anti-weld and friction reducing characteristics necessary to the range of machining operations for which it is recommended.

When selecting a cutting fluid, factors to be considered are material being machined, material hardness, speeds, feeds, depth of cut and machine design. Cullman Wheel Company, Chicago, Ill., a leading sprocket manufacturer, took all these factors into consideration more than 10 years ago. They chose SpeedKut A then and still use it for their multi-spindle automatics to cut sprocket blanks from free machining bar stock and for hobbing the sprocket teeth.

"The Man in the Barrel", your Stuart Representative, will be happy to help you take all of the factors into consideration. Ask to have him call—and ask for a Stuart's Cutting and Grinding Fluid Selector and Dilut-O-Graph Folder, too. It's a quick guide to starting recommendations for any job.

**D. A. STUART OIL CO., LTD. 2741-47 S. Troy St., Chicago 23, Ill.**



## Stuart Oils

*Time Tested Cutting Fluids and Lubricants*

For more data circle 376 on Reader Service Card

December, 1955

modern machine shop 167



## new literature

**Use the Reader Service Cards opposite pages 32 and 340 for requesting free copies of the literature listed below.**

**1. Coolant Systems**

Aetna Mfg. Co., 188 S. York, Bensenville, Ill. "Mistic Mist" Coolant Systems for metalworking operations.

**2. Dust and Vapor Collectors**

Aget Mfg. Co., 390 E. Church St., Adrian, Mich. Dustkop industrial dust collecting equipment and Mistkop industrial vapor collecting equipment.

**3. Steel Cutting Carbides**

Allegheny Ludlum Steel Corp., Dept. MS, Pittsburgh 22, Pa. "Carmet" CA-600 Series steel cutting carbides.

**4. Lubricants**

The Alpha Molykote Corp., 65 Harvard Ave., Stamford, Conn. "Molykote" Lubricants for industry.

**5. Alloy Steels**

Sheffield Steel Division, Armco Steel Corp., Houston, Texas. Sheffield High Strength and Shet-Ten steels.

**6. Rotary Surface Grinder**

Arter Grinding Machine Co., Worcester 5, Mass. Model E Hydraulic Rotary Surface Grinder.

**7. Boiler Tube Corrosion**

Tubular Products Division of The Babcock & Wilcox Co., Beaver Falls, Pa. "Eleven Ways to Avoid Boiler Tube Corrosion."

**8. Process Equipment**

W. F. & John Barnes Co., 369 S. Water St., Rockford, Ill. Automatic process and transfer equipment.

**9. Can Machinery**

E. W. Bliss Co., 50 Church St., New York 7, N. Y. Trimming, beading and flanging machines, thread rollers and automatic curlers and beaders.

**10. Power Tools**

Boice-Crane Co., 937 Central Ave., Toledo 6, Ohio. Power tools for cutting, shaping, drilling and finishing.

**11. Precision Instruments**

Boice Mfg. Co., Staatsburg, N. Y. Dial Gages and Setmasters.

**12. Surface Grinder**

Boyar-Schultz Corp., 2020 S. 25th Ave., Broadview, Ill. 6 x 12 Hydraulic Surface Grinder.

**13. Wheelheads**

Bryant Chucking Grinder Co., Springfield, Vt. Series 800 High-Frequency Wheelheads, alternators and high-frequency motors.

**14. Taper Attachment**

Chandler Tool Co., Muncie, Ind. "Taper-Champ" for boring and turning straight and taper surfaces.

**15. Boring Mills**

The Cincinnati Gilbert Machine Tool Co., 3366 Beekman St., Cincinnati 23, Ohio. Horizontal boring mills, rotary tables, auto-positioners and radial drills.

**16. Engine Lathes**

Cincinnati Lathe and Tool Co., 3265 Disney St., Cincinnati 9, Ohio. "Tray-Top" Model LE Engine Lathe.



### **17. Handling Equipment**

The Cleveland Crane & Engineering Co., 6457 E. 281 St., Wickliffe, Ohio. Tramrail overhead materials handling equipment.

### **18. Boring Bars**

Cyma Corp., 3581 Kipling Ave., Berkeley, Mich. New principle used in boring bar construction.

### **19. Diamond Dressers**

Diamond Products, Inc., 328 Prospect Ave., Elyria, Ohio. Diamond tool dressers, grinding dressers and center cones.

### **20. Gaging System**

The DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. Micro-Step Gaging System.

### **21. Press Brakes**

Dreis & Krump Mfg. Co., 7418 S. Loomis Blvd., Chicago 36, Ill. Four new series of "Chicago" Press Brakes.

### **22. Drill Jig Bushings**

Economy Tool & Machine Co., 1827 S. 68th St., Milwaukee 14, Wis., Drill jig bushings and A.S.A. Standard.

### **23. Magnetic Regulator**

Electro-Matic Products Co., 2235-37 N. Knox Ave., Chicago 39, Ill. "Neutrolator" electro-magnetic chuck control and holding power regulator.

### **24. Drilling Machine**

The Electro-Mechano Co., 265 E. Erie St., Milwaukee 2, Wis. 16-inch precision drilling machine.

### **25. Mandrels**

Erickson Tool Co., 23040 Hamilton Ave., Cleveland 14, Ohio. Westberg "Colletmandrel," a one-piece mandrel actuated in the same manner as collets.

### **26. Thread Grinders**

Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. Styles 33 and 33-L Precision Thread Grinders.

### **27. Air Presses**

Famco Machine Co., 3122 Sheridan Rd., Kenosha, Wis. Single-acting air presses designed for heavy, continuous industrial applications.

### **28. O.B.I. Presses**

The Federal Press Co., 504 Division St., Elkhart, Ind. Open back inclinable presses from 6.6 to 100 tons.

### **29. Short Run Stampings**

Federal Tool and Mfg. Co., 3615 Alabama Ave., Minneapolis 16, Minn. Facilities for producing economical short run stampings.

### **30. Transfer Machine**

Ferguson Machine & Tool Co., Inc., Roller Gear Division, P.O. Box 5841, St. Louis 21, Mo. "Trans-o-Mator" Multiple Station Transfer Machine.

### **31. Punching Presses**

Ferracute Machine Co., Bridgeton, N. J. Standard throat, non-adjustable bed punching presses.

### **32. Abrasive Discs**

Gardner Machine Co., Beloit, Wis. Abrasive discs and cylinder wheels.

### **33. Unitary Seals**

The Garlock Packing Co., 250 Main St., Palmyra, N. Y. "Mechanipak" Seals for process pumps.

### **34. Automatic Screw Machine**

Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich. Screw-matic 750 Automatic Screw Machine.

### **35. Height Gage**

The Greist Mfg. Co., 449 Blake St., New Haven 15, Conn. Micro-Height Gage, a precision tool for measuring layout and inspection work.

### **36. Fixture Clamps**

Harco Engineering, 12092 Woodbine Ave., Detroit 39, Mich. Data on 100 fixture clamps and 1,000 details.

### **37. Hydraulic Feed Units**

The Hartford Special Machinery Co., 287 Homestead Ave., Hartford 12, Conn. Models 405 and 410 way-type hydraulic feed units.

### **38. Drill Blanks**

Hayden Twist Drill Co., 8626 Lyndon Ave., Detroit 38, Mich. High speed steel drill blanks in seven ranges of tolerance from 20 millionths of an inch.



**new literature**... (Use reader service cards opposite pages 32 and 340 for free literature.)

**39. Salt Bath Furnaces**

Hevi Duty Electric Co., Milwaukee 1, Wis. Bellis Immersed Electrode Salt Bath Furnaces.

**40. Riveting Machine**

Hill Machine Co., 1301 Eddy Ave., Rockford, Ill. Pneumatic riveting machine for high speed riveting.

**41. Hardened Blanks**

William T. Hutchinson Co., P.O. Box 328, Union, N. J. Hardened and ground blanks with one end "steel mill" soft.

**42. End Mills**

Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill. "Tri-mil" End Mill with a complete range of flute lengths.

**43. Machining Aluminum**

Kaiser Aluminum & Chemical Sales, Inc., 228 N. LaSalle St., Chicago 1, Ill. "Machining Kaiser Aluminum with Automatic Screw Machines."

**44. Pneumatic Drills**

Keller Tool Division, Gardner-Denver Co., Grand Haven, Mich. "Airfeedrills" for drilling, reaming, spot facing, countersinking, counterboring and center drilling.

**45. Punch Presses**

Kenco Mfg. Co., 5211-A Telegraph Rd., Los Angeles 22, Calif. Four punch press models with 1½ and 7½-ton capacities.

**46. Tooling**

Kennametal Inc., Latrobe, Pa. Kendex tooling, featuring 17 "throwaway" insert styles.

**47. Thread Rolling Machine**

Landis Machine Co., Waynesboro, Pa. "Lanhyrol" Thread Rolling Machine for producing accurate threads in a chipless, cold forming process.

**48. Centerless Grinders**

Landis Tool Co., Waynesboro, Pa. Nos. 12 and 12½ precision centerless grinding machines.

**49. Micro-Drills**

Louis Levin & Son, Inc., 3610 S. Broadway, Los Angeles 7, Calif. Sphinx micro-drills for small and accurate holes.

**50. Air Line Filters**

M-B Products Division of Tool Sales Co., 46 Victor Ave., Detroit 3, Mich. Automatic air line filters, regulating valves and air line lubricators.

**51. Rotary Surface Grinders**

Mattison Machine Works, Rockford, Ill. Nos. 72 and 100 high-production rotary automatic surface grinders.

**52. Honing Equipment**

Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich. Micro-honing process and equipment.

**53. Cutting-Off Machines**

Modern Machine Tool Co., Jackson, Mich. Cutting-off machines for tubing, pipe and bar stock.

**54. Grinding Coolant**

The Motch & Merryweather Machinery Co., 1250 E. 222nd St., Cleveland 17, Ohio. Triple C Grinding Coolant in either liquid or crystalline form.

**55. Gear Checking Machines**

National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. Red Ring gear checking machines.

**56. Grinders and Lappers**

Norton Co., Worcester 6, Mass. Cylindrical grinders; cam, shape and crank-pin grinders; tool and cutter grinders; universal grinders; surface grinders and lapping machines.

**57. Face Mill Grinders**

Oliver Instrument Co., Adrian, Mich. Face mill grinders and the No. 2 arc radius grinder.

**58. Three-Dimensional Cams**

The Parker Stamp Works, Inc., Cam Division, Franklin Ave., Hartford, Conn. Three-dimensional cams for automation, instrumentation and controls.



**59. Lead Hammers**

Podlin Tool Co., 11847 Franklin Ave., Bensenville, Ill. Lead hammer exchange service.

**60. Automatic Turret Lathe**

Potter & Johnston Co., Pawtucket, R. I. Model 4-U Automatic Turret Lathe designed to handle tough alloys.

**61. Comparators**

Pratt & Whitney Co., Inc., 25 Charter Oak Blvd., West Hartford 1, Conn. "Air-O-Limit" Comparators.

**62. Automatic Hitch Feed**

The Product Machine Co., 910 Housatonic Ave., Bridgeport 1, Conn. The "Surefeed," an automatic hitch feed.

**63. Hole Punching Equipment**

Punch Products Corp., 3800 Highland Ave., Niagara Falls, N. Y. "Unipunch" Series A Hole Punching Equipment for unitized tooling in presses.

**64. Reach Fork Truck**

The Raymond Corp., 88-135 Madison St., Greene, N. Y. Heavy-duty reach fork truck which will reach out and pick up or deposit 3,000 pound loads.

**65. Live Center**

Rockford Engineered Products Co., 2324 23rd Ave., Rockford, Ill. Combination live center consisting of interchangeable points, bells and female centers.

**66. Power Hack Saws**

Sales Service Machine Tool Co., 2355 University Ave., St. Paul 14, Minn. Line of Keller Power Hack Saws.

**67. Marking Tools**

Geo. T. Schmidt, Inc., 1806 W. Belle Plaine Ave., Chicago 13, Ill. Marking tools and equipment.

**68. Precision Holding Tools**

Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill. Drill, reamer and tap chucks.

**69. Punch Presses**

Service Machine Co., 2310 W. 78th St., Chicago 20, Ill. "Rousselle" Punch Presses in capacities from 5 to 40 tons.

**70. Grinding Wheels**

Simonds Abrasive Co., Philadelphia 37, Pa. "Simex" Reinforced Red Wheels, a lightweight grinding wheel for heavy-duty stock-removal jobs.

**71. Lathes and Grinders**

The Springfield Machine Tool Co., Springfield, Ohio. Models 280 and "S" lathes and vertical universal grinders.

**72. Carbide-Tipped Tools**

The Staples Tool Co., Cincinnati 25, Ohio. Carbide-tipped reamers, drills, end mills, spotfacers and counterbores.

**73. Transparent Cutting Oil**

Sun Oil Co., Philadelphia 3, Pa. Sunicut 5534, a versatile transparent cutting oil for use on a wide variety of steels.

**74. Die Checker**

Tietzmann Tool Corp., 315-317 N. Main St., Englewood, Ohio. TTCO Die Checker.

**75. Notching Machines**

The V & O Press Co., Division Emhart Mfg. Co., Hudson, N. Y. Notching machines, slotting machines and band punching machines.

**76. Cutting Tools**

The Viking Tool Co., Shelton, Conn. Milling cutters, taper arbors and centering plugs, single-point tools, toolholders and sharpening fixtures.

**77. Turret Attachment**

E. F. Vilter Co., 4161 N. Richards St., Milwaukee 12, Wis. Star Sensitive Turret Attachment.

**78. Bronze Alloys**

Waterbury Rolling Mills, Inc., Waterbury, Conn. Nickel silver and phosphor bronze alloys.

**79. Band Sawing Machines**

Wells Mfg. Corp., 808 Tyler St., Three Rivers, Mich. Metal-cutting band saws for fast, accurate and economical handling of cut-off jobs.

**80. Carbide Tools**

Union Twist Drill Co., Dept. CNR, Athol, Mass. Line of carbide drills and cutting tools.



# CINCINNATI RIGID SHAPERS

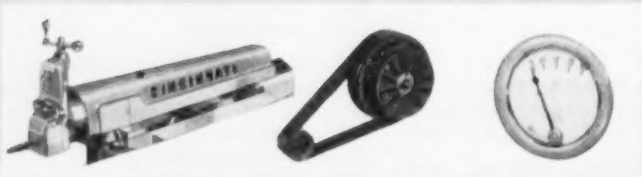
New—modern—these Rigid Shapers offer faster, more convenient controls, greater accuracy, greater dependability. The New nodular iron ram, trunnion and vise, and wide heavily ribbed column give a new rigidity—increase accuracy in cutting.

The New slot-free ram also eliminates the manual clamping of ram adjustment—a time saving feature.

A speedy, dependable electro-magnetic brake and clutch insure a faster performance.

50 P.S.I. pressure lubrication, exclusive on Cincinnati Shapers, is a real insurance against wear and a guarantee of long trouble-free performance.

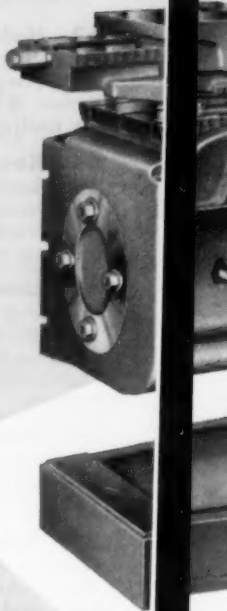
Write for the circular on the New Rigid Shapers.



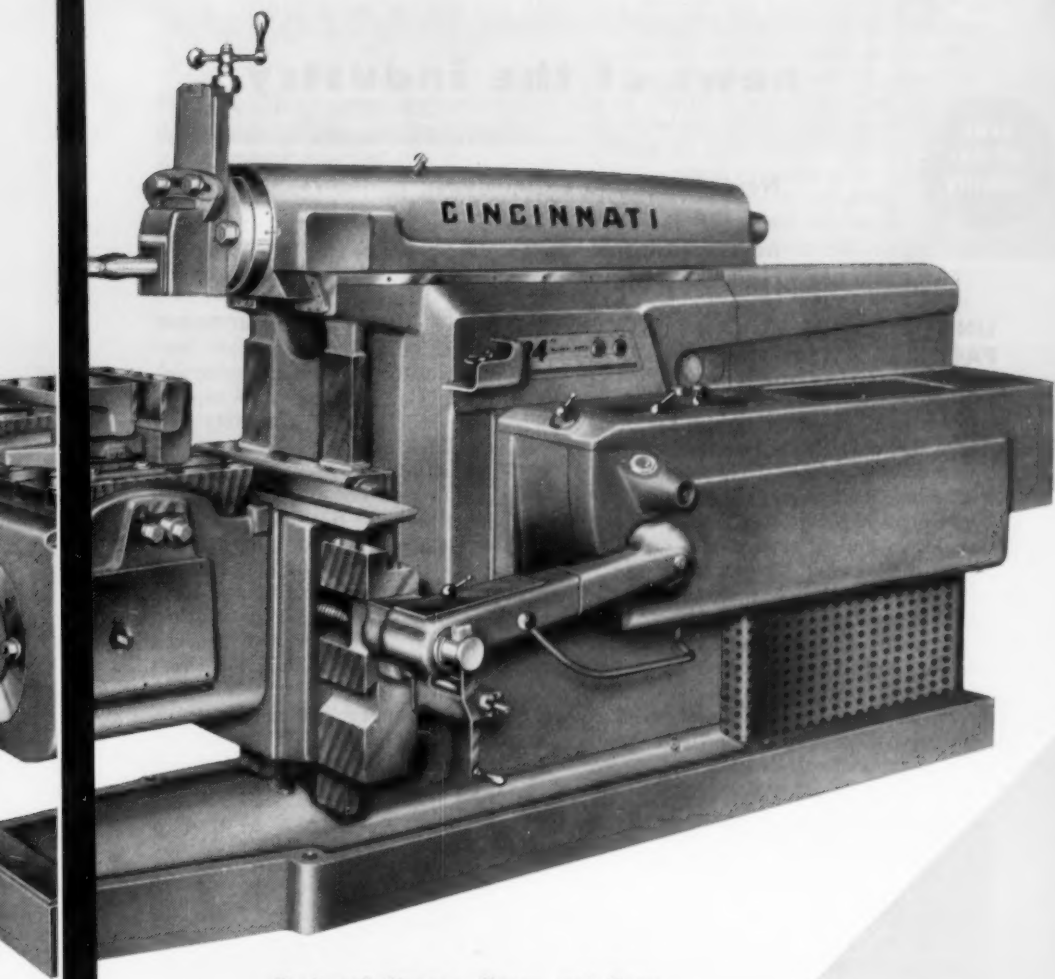
Nodular iron, slot-free  
ram

Electro-magnetic Clutch  
and Brake

The only shaper with  
50 P.S.I. lubrication







Cincinnati Shapers, Shears and Press  
Brakes carry a 5 year guarantee on work-  
manship and material—write for details.

**THE CINCINNATI SHAPER CO.**

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES





## news of the industry

***New plants and expansions . . . shows  
. . . lease plans . . . plant purchases . . .  
new appointments.***

### **LINDE EXPANDS EXPERIMENTAL FACILITIES AT SPEED- WAY LABORATORIES**

Expansion of experimental facilities at the Speedway Laboratories has been announced by Linde Air Products Co., a Division of Union Carbide and Carbon Corp., New York 17, N. Y. Work has begun and is expected to be completed next spring. The expansion program includes the conversion of a former factory building, located adjacent to Sixteenth Street, into a modern laboratory and office building. The laboratory will have double the facilities now available for research and development activities. It will occupy a three-story, fireproof, air-conditioned build-

ing having a floor space of 72,000 square feet. The most up-to-date features of laboratory design are being incorporated. Construction and equipment costs will be approximately 1½ million dollars.

The construction program will make possible new and broader projects for Linde in the fields of physics, chemistry and metallurgy. Investigations will include work in arc welding, acetylene chemistry and engineering, high-temperature chemistry and Flame-Plating of metals. Flame-Plating is a process recently developed by Linde for coating metals with tungsten carbide to improve the wear resistance of many parts used in industry. The expansion of these experimental facilities is



*Architectural drawing of new Speedway Laboratories of Linde Air Products Company*



another step in Linde's and Union Carbide's continuing program for the creation of new and better products.

★ ★ ★

### LEADING METALWORKING COMPANIES WELL REPRESENTED AT ATOMIC SHOW

Evidence that the metalworking industry will probably be among the leaders in atomic progress in the next few years is available from the preliminary exhibitors list for the big Atomic Exposition to be held in conjunction with the U. S. Nuclear Congress in Cleveland, Ohio. Peacetime applications of atomic energy and related nuclear applications are to be featured in the exposition. Some 26 technical societies and management groups with a membership in excess of 400,000 are participating in the congress. Of the approximately 150 U. S. and foreign exhibitors, many are identified with the metalworking industry in one form or another.

Equipment to be displayed ranges from atomic power reactors and relat-

ed equipment to remote control handling equipment, instruments and various types of gages, inspection devices, and so on, using isotopes as the source of energy. Because of the rapid development of peacetime uses of the atom, much of the equipment will be getting its first public showing during the Cleveland exposition. In view of the considerable general industrial interest in peacetime applications of atomic energy, the exposition will be open from

## FIRST for secondary finishing...



### SCHAUER SPEED LATHES

Filing cast iron flange with variable speed type VA3CCA Schauer Speed Lathe.

Schauer Speed Lathes provide the most economical method for performing secondary finishing work on metal and plastic parts. Do filing, trimming, deburring, lapping, polishing, etc., faster, at lower costs on Schauer Speed Lathes. Many sizes and models with holding devices to suit the job. *Speed your production* with Schauer Speed Lathes. Write for Catalog No. 530.

### SCHAUER MANUFACTURING CORP.

4501 Alpine Ave. • Cincinnati 36, Ohio

For more data circle 379 on Reader Service Card



## news of the industry . . .

2 to 10 p.m. on Saturday and Sunday, December 10th and 11th, as well as from 6 to 10 p.m. during the week of December 12-16. Attendance during daytime hours, December 12-16, will be limited to Nuclear Congress registrants and representatives of industry, as well as science and medicine.

## PROGRESSIVE WELDER OFFERS MACHINERY LEASE PLAN IN WELDING FIELD

Progressive Welder Sales Co., Detroit, Mich., manufacturer of standard and special resistance welding equipment, has recently completed arrangements for offering its complete line of equipment (standard or special design) on a lease basis. According to J.

F. McRoberts, vice president and general manager of the company, this new plan will make it possible for many manufacturers to obtain immediate possession and use of resistance welding equipment designed specifically for their use, without impairing vital working capital. The plan is claimed to have many advantages, including the ability to get equipment when needed; no tie-up of working capital; small cash outlay; paying for expansion out of subsequent earnings; elimination of the equipment obsolescence problem; improvement in balance sheet ratios; and possible worthwhile tax savings. Mr. McRoberts states that equipment leasing has proved highly successful.

### WORLD'S HARDEST METAL



**BUSHINGS**

**BLADES**

**ROLLS**

**TOOLS**

**DIES**

**BAR STOCK**

**IMPROVED QUALITY**

Additional refinements and improvements in our process have added still longer life to the wearing edges of Talide tools, dies and wear resistant parts. The result is a carbide having a new, unique grain structure with harder and tougher properties than previous grades. Laboratory tests reveal our improved grades possess 25% greater strength and rigidity. Service life per grind up to 50% longer than previous grades has been proven in grueling field tests.

METAL CARBIDES CORP.,  
YOUNGSTOWN 7, OHIO

Write for Catalog 55-G

METAL CARBIDES CORPORATION

**TALIDE®**

YOUNGSTOWN 7, OHIO

HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS  
HEAVY METAL • CERMETS • HIGH TEMPERATURE ALLOYS  
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

For more data circle 380 on Reader Service Card

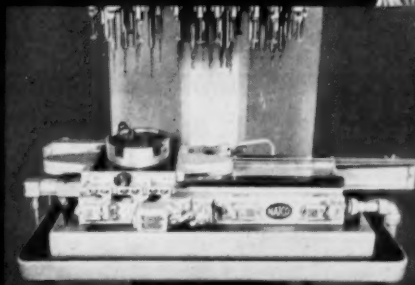


# NEW NATCO DRILLER DOES WORK OF THREE MACHINES

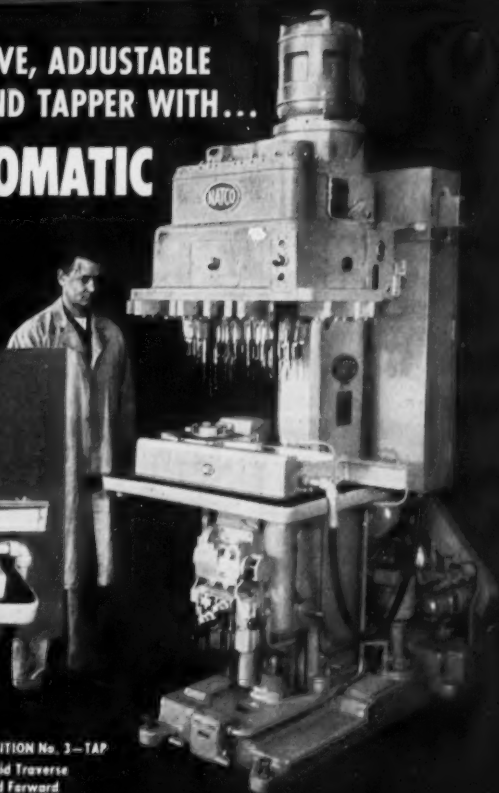
...DRILLS, CHAMFERS AND TAPS AUTOMATICALLY!

NATCO H-6 LIGHT SENSITIVE, ADJUSTABLE  
MULTI-SPINDLE DRILLER AND TAPPER WITH...

## 3 POSITION AUTOMATIC FIXTURE SLIDE



THREE POSITION AUTOMATIC FIXTURE SLIDE IN DRILL POSITION.



### TYPICAL FEED CYCLE

#### POSITION No. 1—DRILL

Load Part  
Rapid Traverse  
Feed Forward  
Rapid Reverse  
Index to Position No. 2

#### POSITION No. 2—CHAMFER

Rapid Traverse  
Feed Forward  
Rapid Reverse  
Index to Position No. 3

#### POSITION No. 3—TAP

Rapid Traverse  
Feed Forward  
Feed Reverse  
Rapid Reverse  
Index to Position No. 1

NATIONAL AUTOMATIC TOOL COMPANY, INC.  
RICHMOND, INDIANA

for answers to your Drilling, Boring, Facing and Tapping problems

*Call a Natco Field Engineer*

CHICAGO, Room 203, 6429 W. North Ave., Oak Park  
DETROIT, 10124 W. McNichols Rd.  
BUFFALO, 1807 Elmwood Ave.  
NEW YORK, 35 Beechwood Ave., Mount Vernon







New plant and offices of Detroit Reamer & Tool Company located in Birmingham, Michigan

ful for both manufacturer and user in other fields, and a preliminary survey of the market indicates a popular demand for the plan.

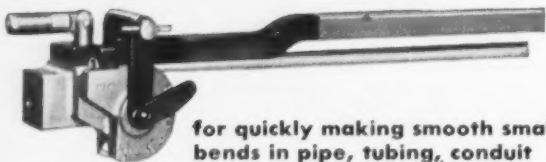
★ ★ ★

### DETROIT REAMER & TOOL MOVES INTO NEW FACTORY AND OFFICES

Detroit Reamer & Tool Company has moved into its new plant and offices lo-

cated at 780 West Maple Road (three miles east of Woodward Avenue) in Birmingham, Michigan. The new factory and office facilities, built to Detroit Reamer specifications, incorporate latest building designs and are equipped with the finest production machinery and office furnishings. Total floor space approximates 14,000 square feet and nearly doubles Detroit Reamer's former production area. Since 1938,

## GREENLEE HAND BENDER



**for quickly making smooth small-radius bends in pipe, tubing, conduit**

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit

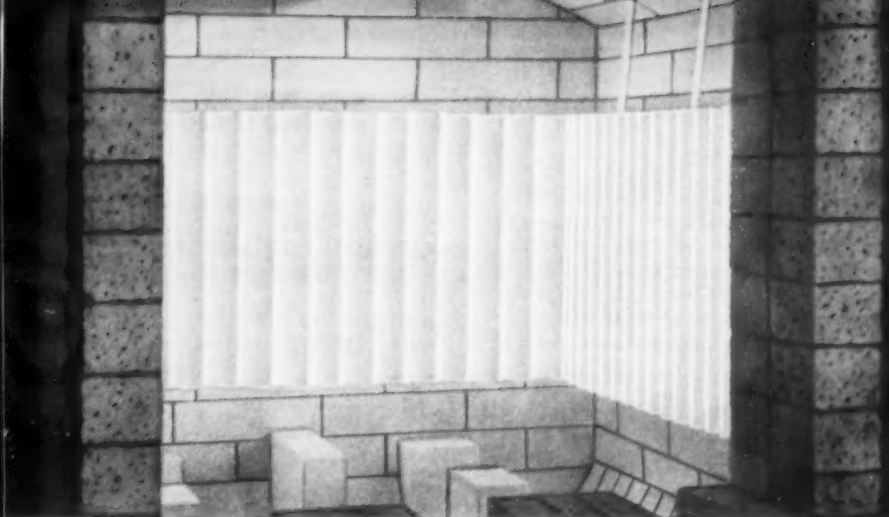


GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write: Greenlee Tool Company, 1992 Herbert Avenue, Rockford, Illinois.



For more data circle 382 on Reader Service Card





## THIS IS LINDBERG'S *New* ELECTRIC ELEMENT

Here is a photograph of Lindberg's new CORRATHERM element for electric heat treating furnaces. You can see how radically advanced this new element is over anything now used.

Wherever electricity is the preferable source of heat for metal treating the CORRATHERM element now makes its use practical, efficient and economical.

And this includes carburizing and carbonitriding furnaces, too! Problems created by the use of electricity in these types of furnaces are eliminated by CORRATHERM elements. These facts tell you how and why:

**LOW VOLTAGE:** Operates at extremely low voltage. No leakage through carbon saturation.

**ATMOSPHERE CIRCULATION:** Elements act as baffles to direct circulation of convection streams.

**SAFETY:** Extremely low voltage eliminates shock or short hazards.

**DURABILITY:** Watts density at all-time low. Elements practically indestructible. Work load or operator's charging tool can't hurt them.

**EASILY INSTALLED:** Element is not enclosed, just hangs in furnace. No complicated mountings required.



Find out how CORRATHERM, Patent No. 2694740 (other patents pending) can be applied to your heat treating processes. Get in touch with your Lindberg Field Representative. (See classified phone book.)

## LINDBERG ENGINEERING COMPANY

2469 West Hubbard Street, Chicago 12, Illinois  
Los Angeles Plant: 11937 Regentview Ave., at Downey, California



as meet the needs of new clients. The firm is now situated to further expand its facilities as demand requires.

★ ★ ★

## EXPANSION FOR AUTOMATION AT GEAR GRINDING MACHINE

Gear Grinding Machine Co., Detroit, Mich., has announced the completion

of a plant addition which provides a 33 per cent increase in floor space. The highly modernized masonry and steel building will enable Gear Grinding to fill increased orders for both screw machines and gear grinders.

In the accompanying illustration, the operator in the foreground is turning the head spindle for one of the company's automatic gear grinders. The operator at the next lathe is machining experimental parts for a new model in the Detroit Screwmatic line. At the far right is the entrance to a temperature-controlled inspection and jig boring room where nine layout inspectors work with the latest equipment, cap-

Detroit Reamer & Tool Company has been supplying industry with special cutting tools, standard drills and reamers, grinding attachments and similar tools. With the new plant, the company is now in position to provide even better service to present customers, as well

over **7,500** Different Selections  
For Immediate Delivery!



Quality-Famous, Heavy Duty  
AIR AND HYDRAULIC

## CYLINDERS

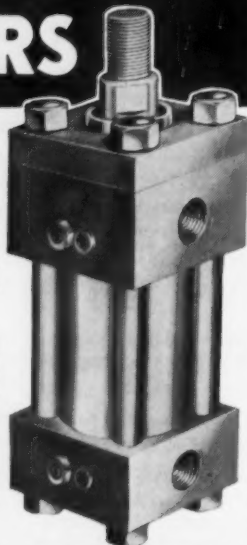
now "in stock" for  
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Eliminate costly production delays—speed-up your design and replacement programs—with this greatest quality selection ever offered on such fast delivery service.

**AIR CYLINDERS**, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

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Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.



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**BORING AND MILLING SMALL PIECES**  
for PRODUCTION WORK or ONE-PIECE JOBS

**The MODEL 2B-36  
DE Vlieg SPIRAMATIC JIGMIL**

latest addition to a famous line of Precision Boring and Milling Machines

Model shown is the  
**NEW 2B-36  
SPIRAMATIC JIGMIL**

available with  
2½" diameter spindle bar  
24" vertical travel  
36" horizontal travel  
Table 36" x 24"



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Illustration showing portion of recently completed plant addition at Gear Grinding Machine Company in Detroit, Michigan

able of measuring to one-half of a ten thousandth of an inch. According to Edgar D. Leon, president of Gear Grinding, the total cost of completely

equipping the addition for production of the new single spindle automatic screw machine will exceed \$500,000.

★ ★ ★

### O. S. WALKER COMPANY TO MANUFACTURE RAWSON COUPLING

O. S. Walker Co., Inc., Worcester, Mass., has announced the acquisition of the business of manufacturing and merchandising the Rawson Coupling which for several years has been made and sold by the Washburn Shops at the Worcester Polytechnic Institute. The personnel and manufacturing resources will be installed at Walker's Rockdale Street plant. The Rawson Coupling is an automatic centrifugal coupling which starts, couples, cushions and compensates for the load between the motor and various types of machines. It consists of two drum-shaped mem-

## PRECISION 16" DRILLING MACHINE

A New Tool with Greater Accuracy and Time Saving Features for Production, Toolroom and Model Shop. Capacity,  $\frac{1}{4}$ ".

### INSTANT SPEED 150 - 4000 R.P.M.

Now, one versatile machine for all types and sizes of Drilling, Reaming, Countersinking and Tapping. Model 601 does each of these jobs at the proper speed with accuracy. Wide speed range is instantly available, reduces set-up time. No lost time changing speeds or over to other machines. Results . . . Higher quality work, less scrap and lost time.

**FEATURES:** Variable speed precision spindle with built-in back gears, driven by a  $\frac{1}{2}$  HP single or three-phase motor. Completely enclosed drive head design; no belt changing required. Convenient direct reading infinitely variable spindle speed control dial. Quick-set depth control with fine adjustment. Built-in work light. Heavy construction plus precision machined for accurate, dependable performance in bench and floor models. Standard chuck capacity, 0 to  $\frac{1}{4}$ ".

Write for FREE DATA on Model 601 and  $\frac{1}{4}$ " Chuck Capacity High Speed 2500 to 15,000 RPM Manual or Air Feed Models. Custom boring machines designed to do your specific job.

MODEL 601 SHOWN, \$378.00 COMPLETE →

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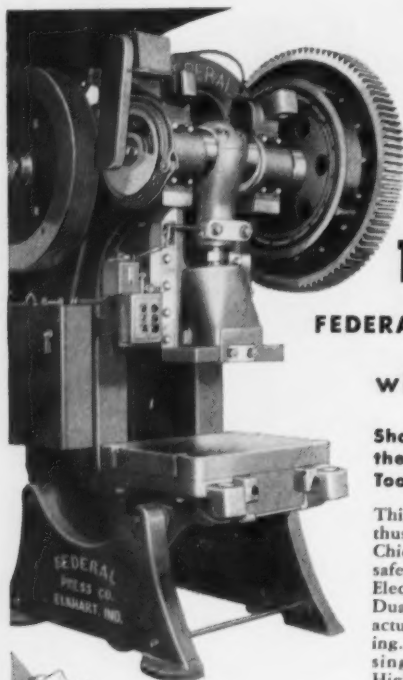
bers, one attached to the driving shaft and the other to the driven shaft. Between driving and driven members are inserted two sets of floating segments or shoes made of various materials, the total weight of the shoes being calculated to give the required horsepower to carry the load. The newly acquired

business will be carried on as The Rawson Coupling Division of the Walker Company.

★ ★ ★

### WESSON EXPANDS CANADIAN OPERATIONS WITH NEW CUTTING TOOL PLANT

Wesson Co., Detroit, Mich., has announced the expansion of its Canadian operations with the opening of a new division in Toronto, Ontario. The new division marks the third major expansion for Wesson within 12 months. This latest expansion follows the recent opening of a new 40,000 square foot metal plant in Lexington, Kentucky, and of a carbide research and development center in Detroit. The new division, identified as Wesson Cutting Tools, Limited, and located at 93 Leicester Avenue in Toronto, will be headed by H. B. Iron, president, and L. P. Chapman, vice president in charge of sales. Both Messrs. Iron and Chapman have been associated with CanAero Consultants, Limited, a Toronto en-



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with air clutch

Shown for First Time at  
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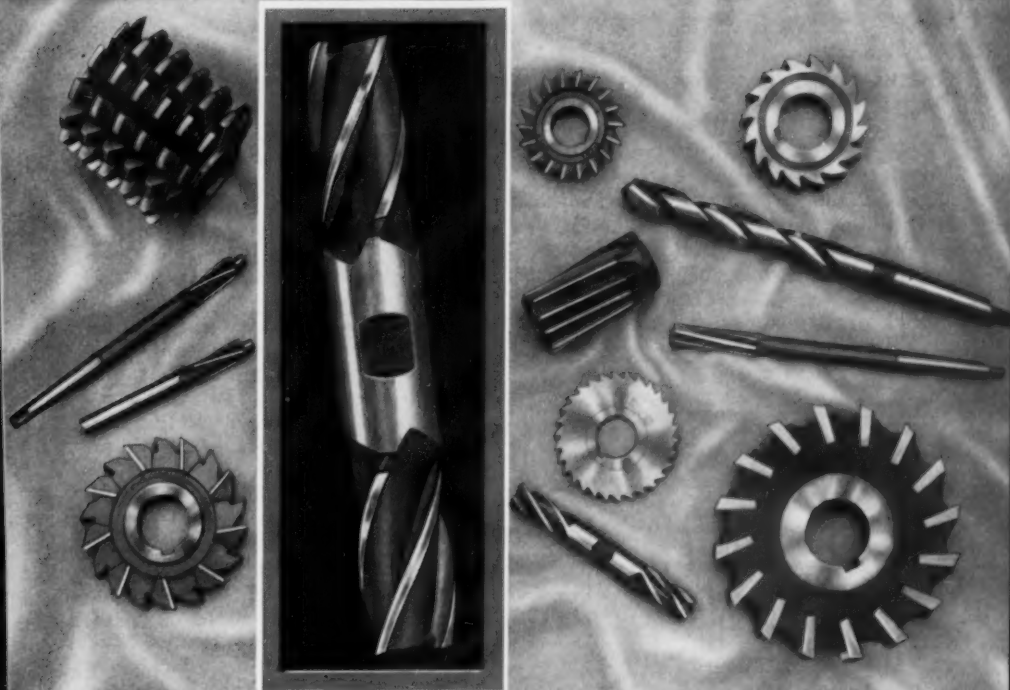
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Inch-timing*  
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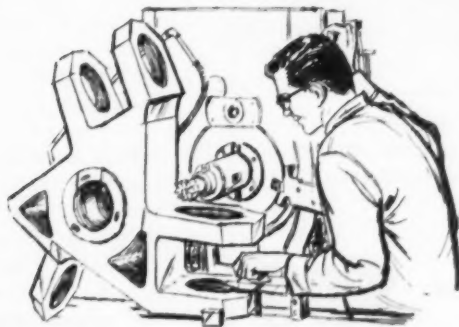
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## news of the industry . . .

gineering firm. Initially, manufacturing operations will consist of standard and special single point tool fabrication. Until now, Wessonmetal carbides used by Canada's metalworking industry were available only on tools fabricated in the United States. The new one-story brick plant includes some of the most

modern equipment which is available especially for the high production of cutting tools.

★ ★ ★

### BLACKHAWK SELLS HAND TOOL LINE TO NEW BRITAIN MACHINE

In a joint statement, Blackhawk Mfg. Co., Milwaukee, Wis., and The New Britain Machine Co., New Britain, Conn., has announced that the "Blackhawk" hand tool line has become the property of New Britain Machine. According to Blackhawk President Philip G. Brumder, by selling its hand tool line to New Britain Machine, Blackhawk is free to further expand and specialize in the broadening fields of hydraulic products and lifting equipment. The addition of the Blackhawk hand tool line to New Britain Machine permits a broadening of its present distribution of hand tools and to even more fully utilize its manufacturing facilities. According to Ralph S. Howe, president of New Britain Machine, the maintenance of the Blackhawk

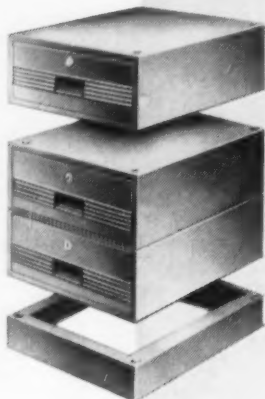
## specify standard

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### DRAWERS and DRAWER TIERS

#### HALLOWELL FEATURES

- 3 drawer sizes—all standard—glide on roller bearings
- Welded throughout
- Recessed handles
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Standard drawers and drawer tier units—all steel and interchangeable—permit you to *custom-build* work areas and storage space quickly and inexpensively to fit your requirements. Stocked by leading shop equipment dealers. Write for literature. STANDARD PRESSED STEEL CO., Jenkintown 22, Pa.

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**SPS**

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**BLANCHARD SURFACE GRINDERS** give you peak production and economy when maintenance is performed on schedule, and when you use the best wheel for each job.

For more than 25 years, Blanchard has been making wheels that do their jobs in less time, with less trouble and cost . . . whether the work is tough as copper or fragile as glass . . . whether it requires heavy roughing cuts or clean-up cuts with flatness of .000005" to .000010" and finish of 1 to 3 micro-inches.

Our quarter century of experience has proven that Blanchard grinders perform best with Blanchard wheels...on every job!

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segment wheels —  
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STREET \_\_\_\_\_

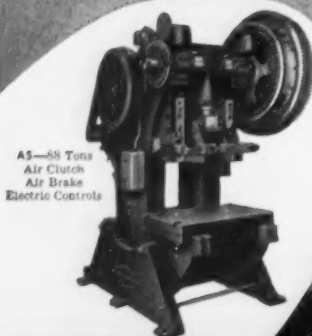
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AS-88 Tons  
Air Clutch  
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- Engages smoothly; no sledge hammer blow.
- Inch, single stroke, or continuous.
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- No back lash when using air cushion or heavy spring pressure pads.
- Clutch is reversible. (By reversing wires on motor you can inch out of stall).

Robinson Presses are available (in either pin type or air clutch models) in sizes from 32 to 88 Ton.

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PRESSES**

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NEW ALBANY, INDIANA

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188 modern machine shop

## **news of the industry . . .**

warranty to present users and sellers of Blackhawk hand tools is pledged. As an added protection to distributors, wholesalers and dealers, New Britain Machine will maintain the Blackhawk trade name on the hand tool line.

★ ★ ★

### **SIMPLEX MACHINE TOOL ELECTS OFFICERS**

At a recent meeting of the board of directors of the Simplex Machine Tool Corp., Milwaukee, Wis., the following officers were elected: Lambert G. Neff, Sr., chairman of the board; Lawrence J. Radermacher, president; Vernon A. Forsberg, secretary and treasurer.

★ ★ ★

### **LEAD HAMMER SERVICE**

Lawrence H. Cook, Inc., East Providence 14, R. I., has announced a money saving plan for all lead hammer users. Many times lead hammer heads are quickly battered out of useable shape, yet their handles are in first class condition. These worn out hammers can be returned to the Cook firm and their heads replaced on the handles at a savings to the owner.

★ ★ ★

### **GROBET FILE RELOCATES IN CARLSTADT, NEW JERSEY**

In step with its general program of expansion, Grobet File Company of America, Incorporated, has moved offices, factory and warehouse from New York City to its newly completed building in Carlstadt, New Jersey, about 10 minutes from Manhattan via the Lincoln Tunnel. The move gives the com-

December, 1955





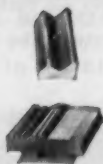
GROUND  
MULTIPLE  
THREAD  
MILLING  
CUTTERS



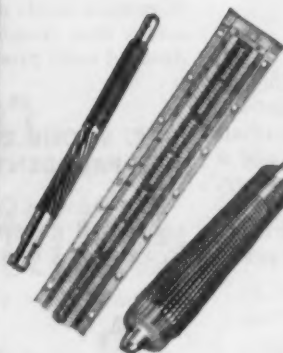
FORM RELIEVED  
MILLING CUTTERS



SINGLE POINT  
TOOLS



FORM TOOLS



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CONTINENTAL DRIVE TOOLS



## Why These Cutting Tools are *Production Proved*

Continental is an Ex-Cell-O subsidiary.

As such, we are constantly trying out new tool designs, new methods, in Ex-Cell-O's big parts production shops.

There could be no finer "proving ground" for testing new materials and new methods. There are no finer cutting tools than "Production-Proved" tools by Continental.

Call in your Ex-Cell-O representative or contact Continental in Detroit for information about them.



55-31

# Continental

TOOL WORKS

Division of Ex-Cell-O Corporation, Detroit 32, Mich.

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**news of the industry . . .**

pany considerably more space, including additional adjacent acreage for further expansion. Consolidation of all operations in the modern plant and a great deal of entirely new machinery, much of it specially designed, is expected to result in manufacturing economies which will permit holding prices

to present levels on the Grobet lines of rotary files, countersinks and other industrial tools produced there.

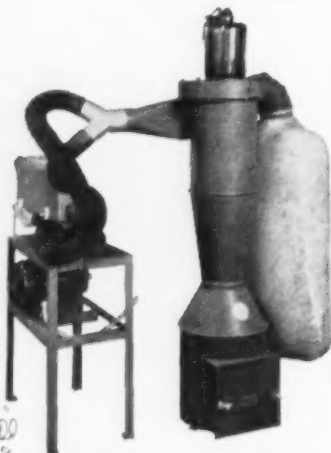
★ ★ ★

**G. E. SHOUP ELECTED EXECUTIVE VICE PRESIDENT OF DUMORE**

The Dumore Co., Racine, Wis., has announced the appointment of George E. Shoup as executive vice president.

The announcement was made by Robert L. Hamilton, president of the precision tool firm, as a result of action taken during the recent Fall Meeting of the board of directors of the company. Mr. Shoup came to Dumore in 1941 as a controller and served in various positions, including secretary, industrial relations manager and director of personnel. He is a certified public accountant in the States of Illi-

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DUST  
COLLECTORS**



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A size and model to solve any dust collecting problem. Torit collectors provide complete, all-around dust control. Torit collectors are unitized for custom installation on each machine, giving power and suction only when machine is operating. Keeps plant and machines free from clogging and unsightly dust. Furthermore, cleaned and filtered air is exhausted back into the room maintaining heat balance. Find out now how Torit unitized dust control is engineered to your problems.

See our catalog in Sweet's Machine Tool File, or write:

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MANUFACTURING CO.**

296 Walnut St., St. Paul 2, Minn.

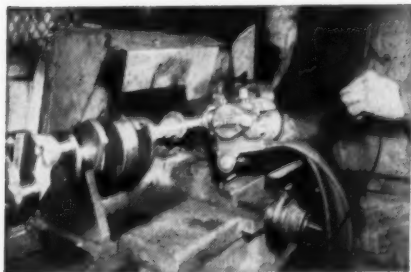
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George E. Shoup



# when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.



## Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.



## Metallizing Engineering Co., Inc.

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METALLIZING EQUIPMENT COMPANY, LTD. - Chobham near Woking, England

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its “wear-ability” over ordinary bearing surfaces as much as 25 times. You haven't just salvaged a part—you've improved it.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

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METALLIZING ENGINEERING CO., INC.  
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- ☐ Please send me Bulletin 57-C.  
☐ Please have Metco Field Engineer call.

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## **news of the industry . . .**

nois and Wisconsin and is a member of the American Institute of Accountants and The Controllers' Institute of America.

★ ★ ★

### **GEN. CHIDLAW ELECTED TO SHEFFIELD BOARD**

Gen. Benjamin Wiley Chidlaw, former commander-in-chief of the U. S. Continental Air Defense, has been elected to the board of directors of The Sheffield Corp., Dayton, Ohio. The announcement was made recently by Louis Polk, chairman of the board and president of the corporation. As the first commander of the overall air defense authority, a post which he assumed in September, 1954, Gen. Chidlaw was charged with responsibility for protecting the United States from enemy aerial attack. The combined armed services authority included Army, Navy, Marine Corps and National Guard units, as well as the Air Force Defense Command at Ent Air Force Base, Colorado, which Gen. Chidlaw also headed. He retired from the Air Force in 1955.

★ ★ ★

### **ALLMETAL ESTABLISHES ANNUAL STAINLESS STEEL ARTICLE AWARD**

In an attempt to bring more information about stainless steel to industry, Allmetal Screw Products Co., Inc., Garden City, N. Y., has announced the sponsorship of an annual award with \$1,000 as first prize. The award will be presented to the author of the article of most value and interest to those who specify or buy stainless steel parts or components. The award was initiated when Allmetal, producer of stainless

fasteners, found that although annual U. S. stainless volume had doubled since 1945, communication about its applications was at prewar level. Allmetal hopes this award will help focus the attention of purchasing agents and engineers to significant findings in stainless steel developments. Additional hoped-for results include articles about stainless that are clearer, documented and more informative.

The actual awards, in addition to the aforementioned \$1,000, include the Allmetal Stainless Steel Award Plaque which will be awarded to the editor of the industrial trade magazine carrying the winning article. Three honorable mention scroll citations providing recognition to selected entries will also be presented. Winners of the First Annual Award will be announced by Allmetal on February 15, 1956. Additional information about the award may be obtained by writing to Secretary, Allmetal Award Committee, Allmetal Screw Products, Co., Inc., Garden City, N. Y.

★ ★ ★

### **VAN NORMAN TO ACQUIRE INSULINE CORPORATION**

As the first step in its recently announced expansion and diversification program, Van Norman Company will acquire the business and assets of Insuline Corporation of America, manufacturer of electronic and electro-mechanical components and assemblies. The new Van Norman subsidiary, which operates in a rented plant of approximately 280,000 square feet in Manchester, New Hampshire, has reported net assets of a little over \$1,600,000 which will be paid for by the issuance of 78,774 shares of Van Norman common stock, subject to adjustments. With products which have included complete units in the electronic, aeronautical, acoustical, automotive, marine, radio and television fields, Insuline

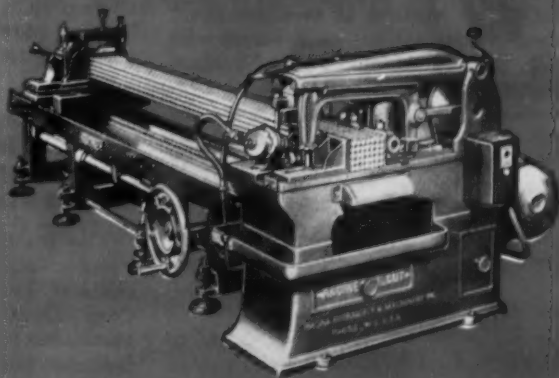


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## *Automatic* STOCK FEED MACHINES

### FEATURING

- Hydraulic Operation
- Progressive cutting feed
- Simplified Control
- Automatic measurement of cuts
- 6" x 6" to 12" x 16" capacities



Racine Machines are used to cut billets, single bars, tubes or bundled material from aluminum to the hardest tool steels and alloys. These Automatic Machines can cut up to 20 square inches of material per minute depending upon the type of metal. You can obtain many production economies in your metal cutting work.

Catalog is available describing RACINE'S complete line of Metal Cutting Machines. Address **RACINE HYDRAULICS & MACHINERY, INC.** 2070 Albert St., Racine, Wisconsin.

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## news of the industry . . .

has also been a prime producer and subcontractor for Defense Agency and other government needs, including the production of portable radio transmitter and receiver units; giant transmitting cabinets; aeronautical shock mounts; a large variety of communication assemblies; precision timing units; and control panels.

Members of the management and engineering groups will continue in their present positions without change, with Samuel J. Spector as president and Myles Spector as vice president. The Sectors will act as directors with J. Y. Scott, president of Van Norman; Herbert I. Segal, chairman of the executive committee of Van Norman, who will also hold this position with Insuline; and R. W. Porter, treasurer of Van Norman and also of the new subsidiary. The new subsidiary's name will be changed to Van Norman Industries, Incorporated.

★ ★ ★

### ALVAN F. LARRABEE

Alvan F. Larrabee, president and director of the Detroit Power Screw-driver Co., Detroit, Mich., died recently. Mr. Larrabee was associated with DPS for 30 years.

★ ★ ★

### E. C. BRITTON TO RECEIVE HIGHEST AWARD IN AMERICAN INDUSTRIAL CHEMISTRY

Dr. Edgar C. Britton, director of the Edgar C. Britton Research Laboratory of the Dow Chemical Co., Midland, Mich., and past president of the American Chemical Society, has been chosen to receive the highest award in American industrial chemistry, the Perkin

Medal of the American Section, Society of Chemical Industry, for 1956. The announcement was made by Clifford S. Rassweiler, chairman of the Jury of Award and vice chairman of the board of directors of Johns-Manville Corporation.

The 1956 award will be the 50th impression of the Perkin Medal, bestowed annually for outstanding achievement in applied chemistry in the United States. Established in 1906, the medal honors Sir William Henry Perkin and commemorates his discovery of the first synthetic dye in 1856. The 1956 medal will be presented to Dr. Britton in September, 1956, at a dinner in his honor, forming part of the celebration of the centenary of Perkin's synthesis.

★ ★ ★

### BUNTING BRASS & BRONZE ACQUIRES DETROIT SINTERED METALS CORPORATION

The Bunting Brass & Bronze Co., Toledo, Ohio, has announced the purchase of The Detroit Sintered Metals Corp., Detroit, Mich. Detroit Sintered Metals has for a number of years manufactured bearings and parts made of powdered metals. The Detroit firm becomes a wholly-owned Bunting company which will continue under its present management and will manufacture sintered metal parts and bearings as in the past. Detroit Sintered Metals will market its complete output through Bunting who, in turn, will sell direct for original equipment applications and through jobbers for those applications normally handled through such distribution. Detroit Sintered Metals is building a new plant in Kalamazoo, Michigan, for the purpose of increasing production on its sintered metal products.

The Detroit Sintered Metals Corporation will operate as an entirely separate company.





Louis Polk



Tell Berna



Jerome A. Raterman



Alfred V. Bodine

## N.M.T.B.A. Elects Officers

Louis Polk, chairman and president, The Sheffield Corp., Dayton, Ohio, was elected president of the National Machine Tool Builders' Association at its 54th Annual Meeting on October 25th and 26th at the Waldorf Astoria in New York City. Tell Berna, general manager of the association for the past 18 years, was elected executive vice president.

Jerome A. Raterman, president, The Monarch Machine Tool Co., Sidney, Ohio, was elected first vice president, and Alfred V. Bodine, president and treasurer, the Bodine Corp., Bridgeport, Conn., was

elected second vice president and director. Perrin G. March, III, president, The Cincinnati Shaper Co., Cincinnati, Ohio, was elected treasurer, and William E. Rutz, executive vice president and works manager, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., was named secretary.

New directors elected, in addition to Mr. Bodine, were Charles S. Davis, Jr., vice president, Lake Erie Engineering Corp., Buffalo, New York, and Ralph E. Cross, executive vice president and secretary, The Cross Company, Detroit, Michigan.



Perrin G. March, III



William E. Rutz

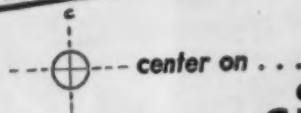


Charles S. Davis, Jr.



Ralph E. Cross





# cincinnati

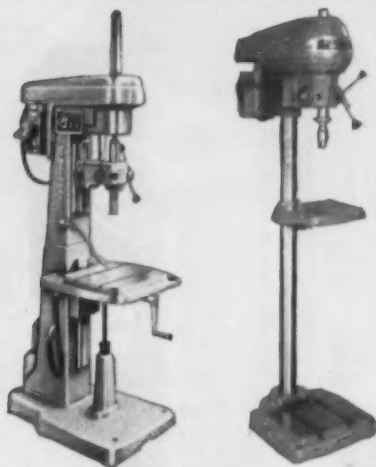


**J.R.WILLIAMS**

THE BOSS  
BOUGHT THEM  
NEW  
**CININNATIS**  
TO PRETTY UP  
THE SHOP--WAIT  
TILL HE SEES  
WHAT **LATHE-**  
**DOG'S** DOIN' WITH  
THEM!

YEAH!  
**LATHEDOG**  
HEARD  
THE BOSS  
SAY THEY'D  
BE REAL  
MONEY  
MAKERS AND  
AT THE ODDS  
**LATHEDOG** IS  
GIVIN' ON  
THEM TOY CARS  
HE'S RIGHT!

A large-size print of this  
J. R. Williams cartoon is  
available for framing.



Even Lathedog appreciates the money-making possibilities of these two *new* Cincinnati Drills. And the *new* 16" Royals and 16" sliding head drills look every bit as good as they run. They're styled to dress up your shop and make it a real metalworking showroom.

With *new* styling and precision come great *new* features. *New*, built-in power feeds give you the production advantages of automatic operation at slight extra cost. *New*, built-in electrical and mechanical controls on both models give you ease of operation never before possible. *New*, rugged construction and built-in belt guard add operator safety to performance and appearance.

Whatever your drilling needs, be sure to see these great *new* models at your local CL&T dealer's showroom. For catalogs D-134, D-138 and price information, plus the name of the CL&T dealer nearest you, write: CINCINNATI LATHE AND TOOL CO., 3261 Disney, Cincinnati 9, Ohio.

# lathes and drills



For more data circle 398 on Reader Service Card

December, 1955

modern machine shop 197





**Now—Lock Your Feed Rates  
to Protect Machines . . . Reduce Costs  
with the CROSS Flow Control Lock!**

Only authorized personnel carry a key for the Cross Flow Control Lock! They set machine feed rate, then lock it.

Easy to install. Just remove valve nameplate and adjusting lever, re-install over lock mounting plate.

Available for Vickers  $\frac{1}{4}$ " flow control valves and remote control panels.

For full details, write Dept. A-612.

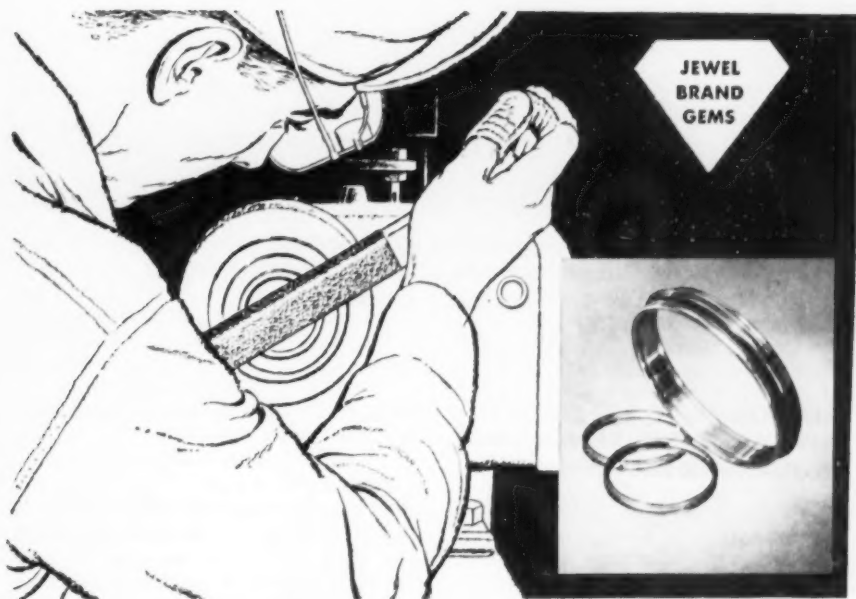
- Eliminates Tampering
- Stops Costly Shutdowns
- Prevents Tool Abuse and Breakage
- Protects Machines Against Overloads
- Reduces Maintenance Costs

Established 1898

THE **CROSS** CO.  
DETROIT 7, MICHIGAN

For more data circle 399 on Reader Service Card





## Putting the finishing touch on new developments at Pawtucket Spinning Ring Co.

To meet the requirements of modern high speed spinning, striking improvements involving advanced manufacturing methods have been made in the spinning and twisting rings of the Pawtucket Spinning Ring Company of Pawtucket, R. I. With it all, Jewel Brand Abrasives continue to be used for applying the *finishing touch*. They produce economically a shiny-smooth surface on the ring faces in keeping with the high calibre of craftsmanship required for precision-finished sections. At the Pawtucket Spinning Ring Company, Jewel Brand Abrasives have

been specified for this purpose over a period of 16 years.

Maintenance of uniformly high quality standards often figures in favor of Jewel Brand Abrasives. Combine this advantage with their longer wear, plus faster, cleaner cutting action, and you have the reason why cost-wise manufacturers turn to Jewel Brand *first for finer finishing*. You can check these advantages so easily. Call your nearby Jewel Brand Abrasive Engineer or Industrial Distributor, or write direct to Abrasive Products, Inc., 507 Pearl St., South Braintree 85, Mass.



For more data circle 400 on Reader Service Card



## new shop equipment

**Descriptions of new machines, tools  
and materials for metalworking.**

Edited by R. L. GRIESINGER

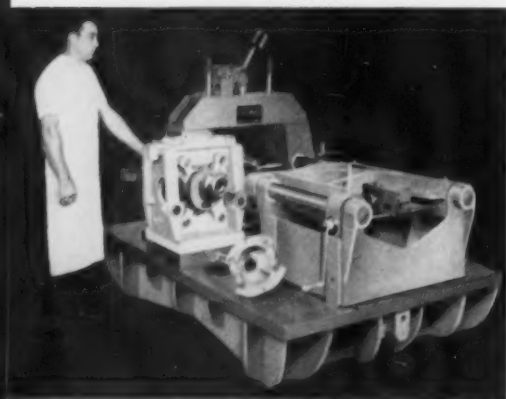
### RELATIONSHIP GAGE CHECKS PROGRESS THROUGH MACHINE OR TRANSFER MACHINE

LaSalle Tool Inc., 3840 E. Outer Drive, Detroit 34, Mich., has announced a Differential Carrier Gage which is designed to eliminate the need for separate set-up gages for each station on the production machine (either progress through or transfer through machines). Using the master work-holding fixture and the working-master differential carrier, the relationship gage is checked for accuracy. Location and clamping on the production machine is

duplicated in the relationship gage. Using the master work-holding fixture and the production differential carrier, the relationship gage, it is claimed, will indicate any misalignment in the production carrier. Because of the size of the work-holding fixture and the differential carrier, a sprocket and chain arrangement has been incorporated to facilitate the loading and unloading of the relationship gage.

Using the working-master differential carrier and the production work-holding fixture, the relationship gage is said to be capable of indicating any discrepancies in locating or clamping surfaces. In addition to the working-master differential carrier, a "master-master" differential carrier is provided, so that occasional checks can be run on the working-master to provide maximum accuracy. Using the master work-holding fixture and the working-master differential carrier, the progress through, or transfer, machine can be checked station by station for spindle height and relationship. The relationship gage is arranged to indicate the station causing trouble immediately.

The work-holding fixture and the differential carrier assembly are loaded at Station No. 1. At Station No. 2, the work-holding fixture and the differential carrier assembly are slid to the load position. Station No. 3 is the gage sta-



LaSalle Differential Carrier Gage in use



tion, and the work-holding fixture and the differential carrier assembly are loaded by means of a manually operated chain and sprocket mechanism. The work-holding fixture is held down against the bottom surface by a cam actuated equalizing clamp, similar to the fixture on the machine, after two locating pins have entered the work-holding fixture. The manufacturer states that because of the rugged construction and the three-point location, this gage requires a minimum of attention to retain its accuracy, even under the most severe conditions.

For more data circle 81 on Reader Service Card

★ ★ ★

### HEAVY-DUTY WHEEL FOR GRINDING STEEL FOUNDRY CASTINGS

A heavy-duty grinding wheel designed for grinding steel foundry castings has been developed by Electro Refractories & Abrasives Corp., Buffalo, N. Y. The wheel is a modified version of one the company designed recently for cleaning stainless steel slabs or billets—one of the toughest metal cleaning operations faced by steel mills. The modified wheel acts soft but cuts fast. It is claimed to be particularly applicable to large foundries where standardized large-scale production is the practice. Used in swing frame snagging to remove excess metal, the wheel is available in sizes ranging from 16 to 24 inches in diameter and from 1½ to 3 inches thick.

For more data circle 82 on Reader Service Card

★ ★ ★

### LATHE IS DESIGNED FOR METAL CUTTING RESEARCH

A turning lathe, identified as the Machinability Test Lathe, which is designed especially for use in metal cut-

ting research has been announced by The Monarch Machine Tool Co., Sidney, Ohio. Providing infinitely variable cutting speeds from 625 to 3,775 r.p.m. and higher with special pick-off gears, the test lathe incorporates sufficient horsepower and rigidity to carry out practically any desired type of cutting test. The machine also is adaptable to a wide variety of test and research instrumentation. With the machine, the resistance of a metal to plastic deformation and the amount of energy converted to heat can be measured and normal tool wear computed. From this data it is possible to select a balanced cutting condition for production which will give economical tool life at high surface speeds. The machine is equally adaptable to the study of special tools and tool geometry, for material control purposes and for research in new alloys, coolants and other materials.

The test lathe, with a design based on Monarch's regular Mona-Matic series machine, is supplied with a 20-h.p. variable speed main drive motor and standard type, mist lubricated headstock. The headstock spindle has a 6-inch A-1 camlock spindle nose for mounting the chuck preferred by the



Monarch Machinability Test Lathe in use



### **new shop equipment . . .**

user. A reinforced carriage and apron design provides the extra rigidity required in test turning, and cross feed, cycle control and tool relief are optional where needed. All machine operating controls, including the speed control, coolant pump control and start, stop and free spindle controls, are apron mounted. The tailstock is a heavy-duty mist-lubricated unit with an anti-friction air-operated center. A special high-capacity coolant pump also is standard. The Machinability Test Lathe offers a clearance diameter of 15 inches and a swing over the compound of 8 inches.

For more data circle 83 on Reader Service Card

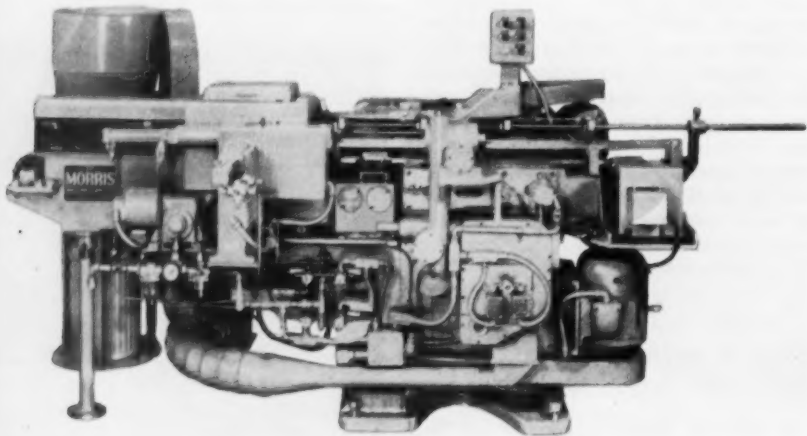
★ ★ ★

### **PISTON BALANCING MACHINE PROVIDES COMPLETE AUTOMATION**

Fed and unloaded by conveyors, a piston balancing machine which is said

to offer complete automation and unusual accuracy has been developed by Morris Machine Tool Co., 934 Harriet St., Cincinnati 3, Ohio. The machine automatically receives, weighs, sorts, positions, clamps, machines and discharges internal combustion engine pistons at production rates to 720 pieces per hour. It maintains piston weights uniformly to tolerances of plus or minus one gram. The balancer receives pistons by conveyor and automatically tests each piston for proper machining position. It will refuse to accept pistons received in inverted positions.

Pistons are automatically weighed. Grossly over and under-weight units are automatically rejected from the machine. Pistons within the gross weight limits are weighed a second time. The machine automatically determines the amount of metal to remove from the trim pads, depending entirely upon the weight of the individual piston. The piston is clamped in milling position and is automatically milled to remove enough metal to bring its weight within the net weight



*Morris Automatic Piston Balancing Machine which provides complete automation and accuracy*



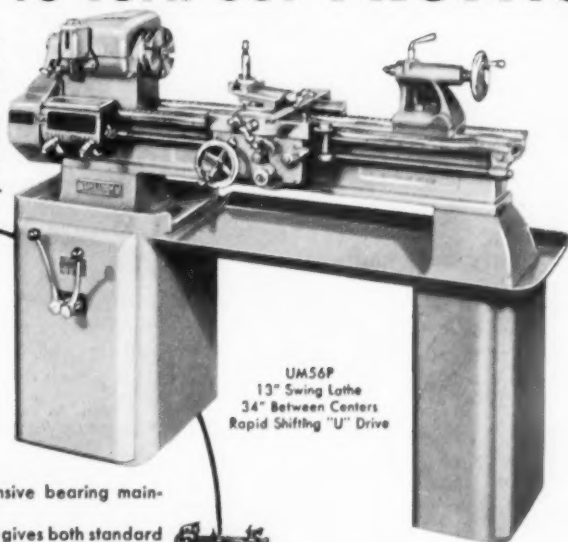
# SHELDON

CHICAGO U. S. A.

**BUILT**

• • • to Turn out **PROFITS**

Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.



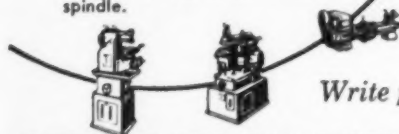
UM56P  
13" Swing Lathe  
34" Between Centers  
Rapid Shifting "U" Drive

## Design Features:

- Large and wide "Zero Precision" Tapered Roller Spindle Bearings—permit operation at all speeds, retain accuracy, and expensive bearing maintenance costs.
- 54-pitch Gear Box—gives both standard and many hard to get thread ratios.
- Large Micrometer Dials—Make accurate operation easier.
- Extra Collet Capacity—1 1/4" hole through spindles available on 10", 11" and 13" swing lathes.
- More Power to Spindle—Efficient drives with bigger motors and double neoprene cog V-belts to spindle.

## OPTIONAL FEATURES AT EXTRA COST

include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.



Write for New Catalog G-55

# SHELDON MACHINE CO., Inc.

4250 N. Knox Ave.

Chicago 41, Illinois

For more data circle 401 on Reader Service Card





### **new shop equipment . . .**

tolerances. After milling, the pistons are automatically discharged from the machine for transport to further operation stations.

Powered by a heavy-duty 5-h.p. motor, the automatic piston balancing machine is equipped with a complete electronic cycle control panel. The machine has an automatic positive lubrication system, heavy cast iron base and is built to high machine tool standards of accuracy and precision.

For more data circle 84 on Reader Service Card

★ ★ ★

### **IMPROVED BAR FEED FEATURES INCREASED EFFICIENCY**

Boyar-Schultz Corp., 2020 S. 25th Ave., Broadview, Ill., has announced several improvements in design in its "Hydra-Lite" Hydraulic Bar Feed.

According to the manufacturer, these design improvements considerably increase the efficiency and dependability of the hydraulic bar feed. Now built as a self-contained unit, it operates with an independent motor drive. The range of sizes of the unit has been increased to accommodate stock diameters of  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ ,  $1\frac{1}{8}$ ,  $1\frac{1}{4}$  and  $1\frac{1}{2}$  inches. A new feature returns the piston to the rear of the stock tube semi-automatically.

For more data circle 85 on Reader Service Card

★ ★ ★

### **HORIZONTAL DRILLING AND BORING MACHINE HAS 5-INCH SPINDLE**

For large drilling, reaming, boring, tapping and spot facing operations with modern cutting tools, Kaukauna Machine Corp., Kaukauna, Wis., has announced the Model 3045 Horizontal Drilling and Boring Machine which has a 5-inch diameter nitralloy spindle

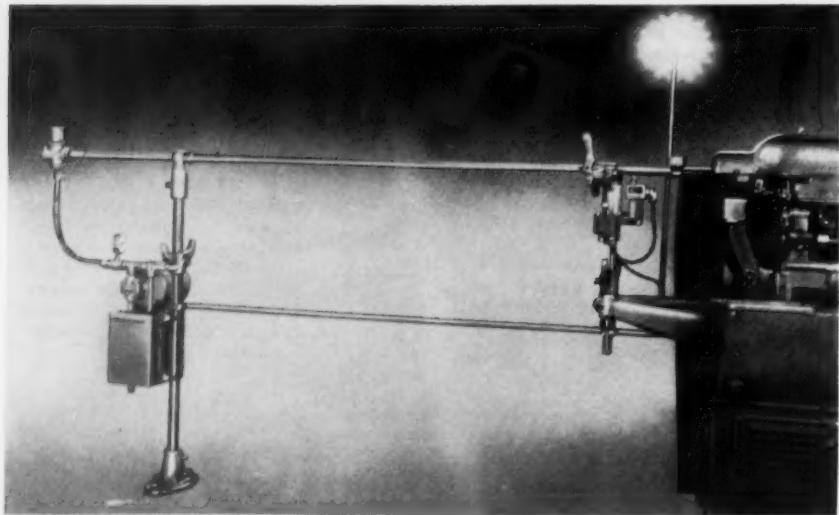


Illustration showing the Boyar-Schultz Improved "Hydra-Lite" Hydraulic Bar Feed



Unmatched in milling range and versatility!

# the **NEW** **RANGEMASTER**



## **Unique Range**

28" table travel  
12" transverse feed  
22 $\frac{1}{2}$ " sliding head movement  
20 $\frac{1}{2}$ " vertical feed  
3 $\frac{1}{2}$ " hand movement of quill  
in universal head

The new Brown & Sharpe Rangemaster provides work-range and milling flexibility unmatched by any other single machine! Saves tremendously on set-ups—especially multi-surface jobs. Easily changed from horizontal to vertical or angular milling. Full power on both spindles for all work; vertical spindle has 18 speeds from 80 to 3060 rpm. Exclusive features: Quill feed and universal head movement give 360° range in two planes without extra attachment. Both

spindles on same vertical centerline. Massive ways, 22" wide, for sliding head. Available as universal or plain milling machine. Write for details. Brown & Sharpe Mfg. Co., Providence, Rhode Island.



## **Brown & Sharpe**



### **new shop equipment . . .**

providing 42 inches of continuous spindle travel under power feed and a positive drive employing motors up to 25 h.p. Unusual accuracy is said to be secured by mounting the spindle in a hardened forged sleeve set in precision taper roller bearings. The sleeve is driven by horizontally-mounted change gears in the headstock, and all speed and feed gearing is shaved and hardened for smooth, quiet transmission of the full power available from the drive motor.

All controls are located at the extreme front face of the headstock, within easy reach of the operator. Speed and feed changes are made automati-

cally and are selected by rotating a dial. This movement to a new position automatically causes the machine to shift into the desired feed or speed. Positioning of the headstock on the column and the column on the runway is controlled electrically. Fast and accurate location is secured throughout the entire travel range by a unique two-speed traverse mechanism controlled by a single push button which gives rapid traverse at 100 inches per minute and positioning traverse at 4 inches per minute. Individual motors for vertical and horizontal movement enable the operator to locate his tool simultaneously in two directions.

Automatic lubrication is provided for the entire machine. The headstock is completely pressure lubricated; and both column and runway ways have forced feed lubrication. Rigidity and strength are claimed to be ensured by the use of heavily ribbed, rugged semi-steel castings. Runway slide liners are provided to give long life to the runway and to ensure accuracy throughout the life of the machine. The basic machine has 48 inches of vertical travel and 48 inches of horizontal travel; but both vertical and horizontal travel can be increased to meet individual requirements. On extended vertical travel machines, operator platforms, ladders and other special features are added to provide maximum operator efficiency on large or small work. A full complement of accessories are also available to extend the range and application of the machine.

For more data circle 86 on Reader Service Card

★ ★ ★

### **SPECIAL MACHINE DRILLS SIX HOLES IN CARRIER GEAR**

Michigan Drill Head Co., P.O. Box 4643, Detroit 34, Mich., has announced a special high-production gun drilling machine which is designed for drilling



**Kaukauna Model 3045 Horizontal Drilling and Boring Machine with 5-inch spindle**



# Magnesium

---

## made it

---

## portable

---



### Lightweight tooling plate builds advantages into portable fixtures . . . with important savings

There's a growing preference for magnesium tooling plate—and good reason, too! It's lighter in weight, easier to machine, and lower priced than most commonly used tooling materials.

The light weight of magnesium— $\frac{2}{3}$  the weight of aluminum,  $\frac{1}{4}$  the weight of steel—permits ease of handling in portable jigs and fixtures for increased speed, safety and economy.

Magnesium plate is rolled for greater accuracy. Dimensional stability is assured by stress relief through oven flattening. Get all the details from your Dow Magnesium distributor, or write to THE DOW CHEMICAL COMPANY, Midland, Michigan.

THE DOW CHEMICAL COMPANY  
Magnesium Sales Dept. MA 320P-1  
Midland, Michigan

Please send the booklets checked below:

- ☐ Tooling plate brochure
- ☐ Booklet "Machining Magnesium"
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Name

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*you can depend on* **DOW MAGNESIUM**



For more data circle 403 on Reader Service Card



### **new shop equipment . . .**

six holes (ranging from 0.5102 to 0.5107 inch in diameter) in a carrier gear. According to the manufacturer, the machine drills to size within 0.005 inch and to location within 0.001 inch. It is claimed to be capable of producing 400 parts in an eight-hour shift, with no further operations being required. Furthermore, the machine is built to handle three totally different parts. The diameter of the largest part the machine will handle is 12 inches, and the diameter of the smallest part is 6 inches. The machine is said to be capable of handling this large range without any complicated change-over. It can be converted to handle one part or another, easily, in three minutes.

The gun driller will also handle double-flanged parts, with an opening between flanges of up to 2 inches. High

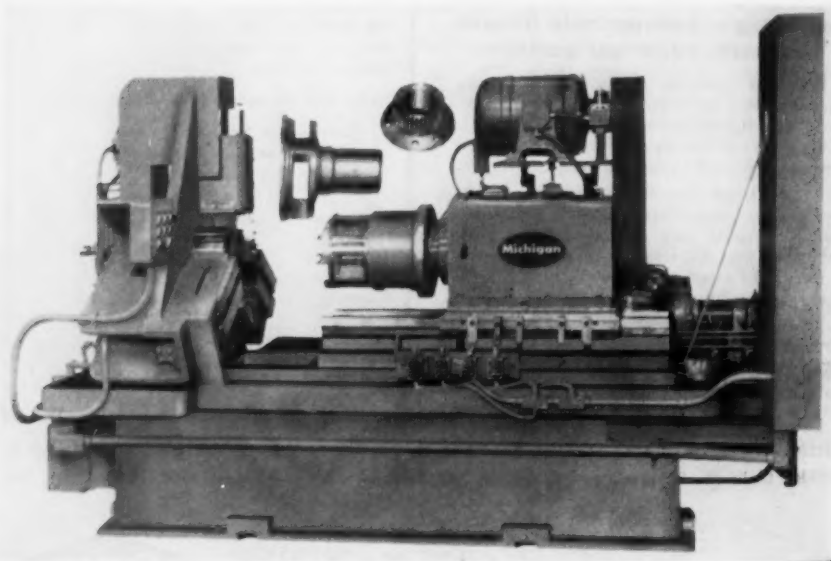
speed production is maintained by a jump feed to cut down the cycle time. The machine operates rapid advance to the first flange; feed through; rapid advance to the second flange; feed through; and rapid return. The machine is of the horizontal way type, with hydraulically operated bushing position slides. Built to J.I.C. hydraulic and electrical standards, the driller is provided with automatic lubrication throughout, and a special high-pressure coolant system provides rapid dispersion of chips from gun drill tips, as well as lubricating the drills.

For more data circle 87 on Reader Service Card

★ ★ ★

### **SPECIAL PRESS ASSEMBLES AND STAKES AUTOMOTIVE PARTS**

A special 25-ton press with electrical controls for automatically assembling and staking the drive flange of an au-



**Michigan Special High-Production Gun Driller for drilling six holes in a carrier gear**



## PUTNAM END MILLS are HIGHEST QUALITY



*Highest Quality* is derived from years of experience, continued dedication to functional research, pride in accomplishment and unexcelled manufacturing facilities.

Throughout the entire Putnam line of end mills (there are over 1200 standard sizes and types) you will find strong evidences of superior design and workmanship. For example: The ability of Putnam End Mills to last longer, and cut cleaner when operated at high speeds and heavy feeds on tough milling operations is indicative of their higher quality.

A trial of Putnam Quality on Your toughest milling job will surely convince.



# PUTNAM

2981 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

For more data circle 404 on Reader Service Card



## **new shop equipment . . .**

tomotive transmission to a pinion gear and then assembling a bushing into the gear has been announced by American Broach & Machine Co., Ann Arbor, Mich. The machine is equipped with a special work base, a hydraulic assembly cylinder, hydraulic loader and hopper feed. A spiral bar and nut assembly guides the flange in assembly to the helical spline teeth of the gear. Tooling includes a helical spline locator for location of the gear in work nest from previously cut teeth and hardened and ground staking tools mounted on the ram nose piece.

The operator loads a gear in the work nest, radially locating from one of the gear teeth. He then loads a flange up over the splined nose piece of the ram, which locates radially from the previously cut internal splines of the flange. The buttons are pushed, starting the machine cycle. The ram descends,

pressing the flange over the gear and staking the two together. The ram remains down, holding the workpiece until a bushing is assembled from under the work nest up into the gear. A hydraulic cylinder, with cross head and guide bar arrangement and interlocked to the machine cycle, automatically assembles the bushing into the gear. The bushings are fed continuously by a rotary hopper into a magazine tube feed.

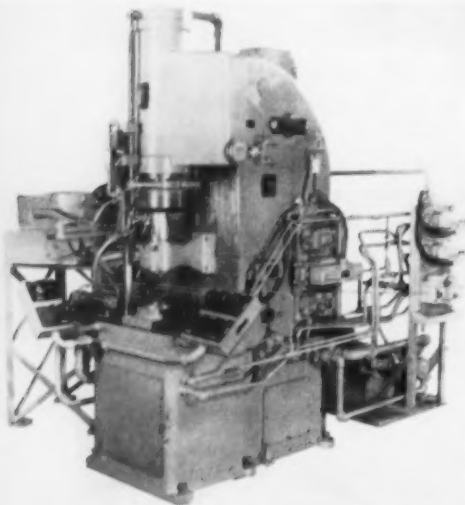
A hydraulic loading slide interlocked to the cycle transfers the bushings one at a time into the assembly position under the work nest. After the bushing has been assembled into the workpiece, the ram returns to the up position and the operator unloads the completed part. The complete cycle for assembly of the workpiece is claimed to be approximately 17 seconds.

For more data circle 88 on Reader Service Card

★ ★ ★

## **GEAR GRINDING MACHINE IS FULLY AUTOMATIC**

Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich., has announced a gear grinding machine which is fully automatic. According to the manufacturer, the machine features automatic loading, automatic rejection, automatic stock equalization, automatic release of workpieces, automatic down feed and automatic trimming. In addition, the following features are also utilized by the machine: controlled coolant flow through the grinding wheel to ensure non-tempered, case-hardened gears; single or double diamond trimmers which offer perfect blending of fillet and profile; multi-ribbed grinding wheels which increase the production rate by increasing the number of teeth being ground simultaneously; multiple fixed diamond trimmers which virtually eliminate



**American Special 25-Ton Capacity Press**

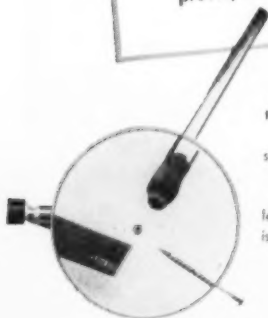




# PRECISION GEARS

**YOU** who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

**YOU** who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.



The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.



## WANT FACTS?

Write for Bulletin No. 5419.  
Address The Hamilton Tool Company  
828 South Ninth Street,  
Hamilton, Ohio.



IT'S A

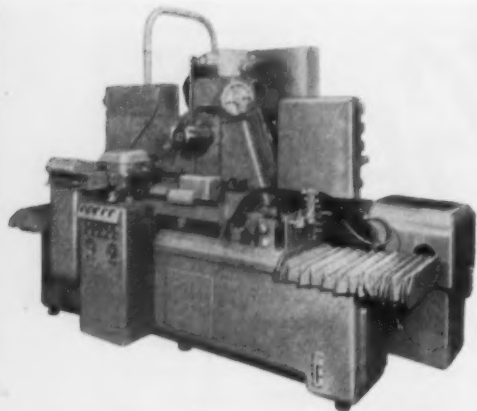
# Hamilton Tool

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For more data circle 405 on Reader Service Card



**new shop equipment . . .**



**Geargrind Fully-Automatic Gear Grinder**

grinding wheel dressing time; and a time recorder attachment which accumulates the total machine cycle time for production control.

For more data circle 89 on Reader Service Card

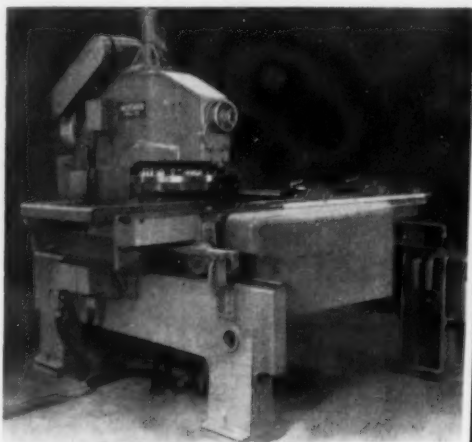
★ ★ ★

**TURRET PUNCH PRESS IS FULLY AUTOMATIC**

A turret punch press which is completely automatic has been introduced by Wiedemann Machine Co., 4219 Wissahickon Ave., P. O. Box 6794, Philadelphia 32, Pa. This press, it is claimed, maintains the Wiedemann principles of economy, versatile tooling, minimum setup and no layout, while the automatic controls cut piercing time, minimize fatigue factor and assure uniform accuracy. All of these features are designed to permit efficient production scheduling. With the press, complicated hole patterns, including openings of many sizes and shapes, are located and punched in

large steel sheets with maximum speed and facility. The operator merely loads the material and unloads the finished work.

The press and work locating table are controlled by a tape fed, electro-mechanical programming unit to perform all functions automatically—simultaneously positioning work under punch, selecting turret station carrying proper punch and die (any one of 20 up to 6 inches square) and then tripping the press. This cycle is automatically repeated in rapid sequence until all holes are accurately located and punched. The special vinyl tape, which is not affected by shop oils or grease, is said to eliminate the need for shop drawings, templates or time-consuming manual layout of each hole location. The complete job is punched on the tape and, once prepared, the tape becomes the "template" for the job. It can be used and filed for subsequent use. Since the entire job is contained in one tape, no part of the job information can be lost or misplaced. Unlimited engineering changes can be made at negligible cost. The location



**Wiedemann Automatic Turret Punch Press**



**do you  
WASTE MONEY  
RISK ACCIDENT  
doing things the  
HARD WAY?**

*Take* a trip through  
your plant today and note how  
many assembly and  
maintenance operations are  
being done in awkward  
or tiresome  
positions.



*Imagine*  
THEM BEING DONE ON  
**PORTELVATOR**  
THE HANDY HAMILTON PORTABLE ELEVATING TABLE

With Portelvator hundreds of assembly and  
maintenance jobs are accomplished at  
the right height and in the best light.  
And that means money in the bank  
and workmen on the job; faster  
work and fewer accidents.

Portelvator prices start at \$155.00—  
place a couple at your workmen's  
disposal and watch results.

*Complete* description in  
FREE Bulletin No. P-5403.

**WRITE FOR IT!**

Address The Hamilton Tool Company,  
828 South Ninth Street, Hamilton, Ohio

 **IT'S A**  
**Hamilton Tool**  
USE IT WITH CONFIDENCE

For more data circle 406 on Reader Service Card



## **new shop equipment . . .**

or size of any hole may be changed simply by covering that section of the tape with a gummed sticker and punching the new information. In fact, any section of the tape can be removed, replaced or covered. The entire programming unit and controls are electro-mechanical. "Building block" units are used and installed on sliding, pull-out trays for simple maintenance.

This automatic press has the same basic features of all Wiedemann turret punch presses. The turrets hold all punches and dies normally required for each job. Punches and dies of any size or shape, including groups, louvers and knockouts, can be used within the capacity of the press. Any punch or die is brought into piercing position automatically during the work locating cycle without loss of time, and the turrets are locked in position to assure perfect tool alignment. When desired, any punch or die can be replaced quickly and easily. Any Wiedemann turret punch press with direct measuring table and gage can be supplied with the automatic programming unit.

For more data circle 90 on Reader Service Card

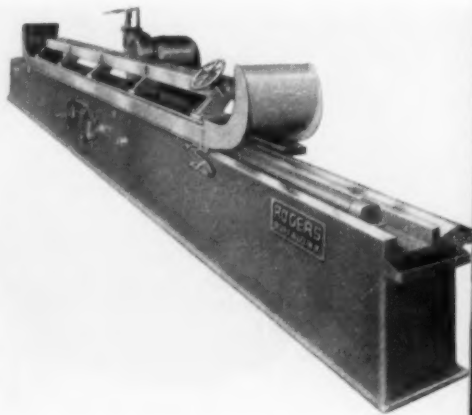
★ ★ ★

## **KNIFE AND FACE GRINDER FEATURES HYDRAULIC TABLE DRIVE**

Samuel C. Rogers & Co., Inc., 2070 Sheridan Drive, Buffalo 23, N. Y., has announced the Series 220 Cabinet Base Knife and Face Grinder which features a hydraulic table drive. The machine is of the traveling table design for face and bevel grinding of shear blades, chipper and other straight knives, as well as for production face grinding of steel parts. The hydraulic table drive provides table speeds which are variable from 10 to 100 feet per minute.

Faster table speed can be furnished, if required. The hydraulic system includes one cylinder, hydraulic pump, control valves, gages and all necessary piping. It is driven by a 5-h.p. motor and controls.

The carriage travels on wide self-aligning machine-ground ways of the combination type with one vee and one flat way. The grinding wheel head features a built-in motor with a special spindle mounted on heavy-duty preloaded ball bearings. The wheel head motor is available in either a 15 or 25-h.p. capacity. A segmental grinding head of 20, 24 or 30-inch diameter is mounted directly on the motor spindle. The wheel head is automatically or manually fed to the work over precision machine ways. The head is adjustable for flat or concave bevel grinding. A magnetic chuck for holding the work is available in all sizes, and a mechanical knife bar or swiveling work table can also be furnished. The machine is equipped with a motor-driven cooling system. A fully-machined, plunger type wheel dresser mounted on a heavy-duty wheel guard is supplied as



**Rogers Series 220 Cabinet Base Knife and Face Grinder with hydraulic table drive**



**IT'S A HAMILTON**



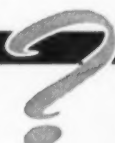
**INDEED**

There is no way under the sun to do small, precision tapping with "production" speed, satisfactory tap life and acceptable accuracy, other than to use a tool designed for the specific purpose.

**THE *Hamilton* SUPER-SENSITIVE  
SMALL HOLE TAPPING MACHINE  
IS SUCH A TOOL!**

**WANT ALL THE FACTS**

Write for Hamilton Bulletin No. 5203.  
Address The Hamilton Tool Company,  
828 South Ninth Street, Hamilton, Ohio.



**IT'S A**

***Hamilton Tool***  
**USE IT WITH CONFIDENCE**

For more data circle 407 on Reader Service Card





## STUB REAMERS

in decimal sizes

For Screw Machines, Turret lathes and Drill Presses are the precise answer to all your special reaming problems. They are ground with **perfect accuracy** and backed-off to width of land and angle for the material to be reamed; Thus, tailor-made SUPEREAM STUB REAMERS mean extraordinary production efficiency and economy.

WRITE FOR INVENTORY STOCK LIST! Why buy a Decimal reamer as a SPECIAL — when you can buy the SUPEREAM DECIMAL REAMERS from stock for immediate delivery.

WRITE FOR BULLETIN #15

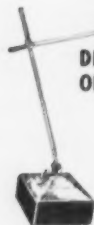


**Uneda  
LIGHT**

**DIRECTS A BEAM OF WHITE LIGHT  
ON YOUR CLOSE PRECISION WORK**

Write for Bulletin #30

Created by a tool & die maker, who discovered so many practical applications for this special-lit. Particularly for close precision work. Increases efficiency—avoids eye-strain.



in emergency

phone: LIBERTYVILLE 2-4200

**TWENTIETH CENTURY  
MANUFACTURING CO.**

ROUTE 176 and BRADLEY ROAD  
Box 429-M LIBERTYVILLE, ILL.



For more data circle 408 on Reader Service Card

216 modern machine shop

**new shop equipment . . .**

standard equipment. The bed and table ways are separately lubricated by a special automatic oiling system. All heavy castings are normalized.

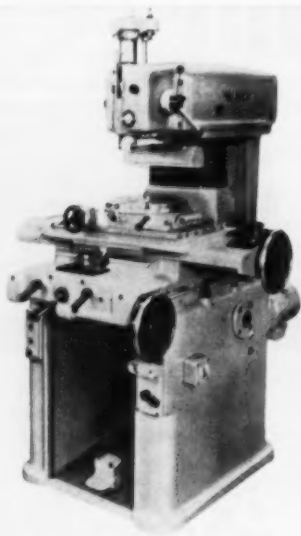
The Series 220 Grinder is available in standard sizes of 78, 90, 102, 110, 134, 160, 180, 200 and 220 inches. Longer sizes can be supplied on special order. The 220-inch capacity machine is 30 feet long and weighs over 11 tons.

For more data circle 91 on Reader Service Card

★ ★ ★

## IMPROVED JIG BORER FEATURES INCREASED CAPACITY

Carl Hirschmann Co., Inc., 30 Park Ave., Manhasset, N. Y., has announced the Hauser Model 3BA Precision Jig Borer which, while retaining the sensitivity and ease of control of the Hau-



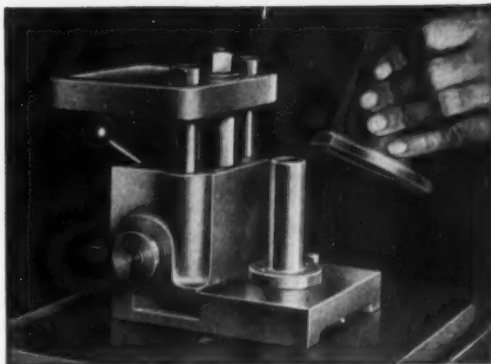
Hauser Model 3BA Precision Jig Borer

December, 1955



## **BIG SAVINGS in PRODUCTION TIME ...and INCREASED ACCURACY!**

### **...yours with the New A·B·C LIFT SWING Drill Jig FIXTURE**



The PATENTED "Swing Away" Top Plate can be moved completely out of the way, permitting faster loading, easier nesting, ready inspection of the part, simplified and easier unloading.

Placed over the work in locking position, the Top Plate is aligned in the same way as a precision Die Set, by means of two hardened and ground bushings which glide over immovable, precision ground guide pins. There is no play to permit inaccurate registry.

A positive and simple locking mechanism locks the fixture securely, with a slight pressure on the handle. The same slight pressure releases the top plate and raises it to swing position. Drill in TWO places — The Lift Swing feature

can be laid on its back to perform drilling operations in second plane, 90° from that of the original drilling.

"Impossible holes" become possible — Using a double top plate which can be swung a full 180°, you can drill two holes side by side with a minimum wall thickness between and without regard to the wall thickness of the drill jig bushings themselves. Also, you can drill a smaller or larger hole without removing the piece from the fixture. You simply drill, lift, swing plate — then lock and drill again.

Write for Color Circular L. S., which gives detailed engineering information, diagrams, range of plate and fixture sizes, etc. Demonstration in your own plant may be arranged. No obligation.

## **ACCURATE BUSHING COMPANY**

Department T-E

Main Office and Factory

**433 North Avenue, Garwood, New Jersey • WEstfield 2-6400**

Engineering Office and Regional Warehouse

**5722 W. Chicago Ave., Chicago 51 • ESterbrook 8-7180**

For more data circle 409 on Reader Service Card



## new shop equipment . . .

ser Model 2BA, incorporates many new features to greatly increase its range and usefulness. Among the many advantages of the Model 3BA are greater boring capacity, greater height adjustment, heavier quill, larger table surface and greater table travel. The



## COLLIS COLLET EQUIPMENT

★ COLLIS Equipment fills today's important production needs so well because they are made by men skilled in making this type of equipment. Supply the proper unit from a complete range of types and sizes for Drill Sleeves and Sockets, Lathe Centers, Chuck Arbors, and Drill Drifts. We will handle your orders promptly.

**THE COLLIS COMPANY**  
DEPT. A, CLINTON, IOWA

For more data circle 410 on Reader Service Card

218 modern machine shop

working surface of the table measures  $21\frac{3}{4} \times 12\frac{3}{4}$  inches, and the longitudinal table travel is  $15\frac{3}{4}$  inches. The travel of the transverse slide is 10 inches. Other features of the Model 3BA include a  $23\frac{1}{2}$ -inch maximum distance from the boring spindle to the table, an adjustment of the vertical slide of 15 inches, and a  $5\frac{1}{8}$ -inch vertical travel of the boring spindle. Standard equipment for the machine includes a dial indicator locating attachment, locating microscope and drill guide attachment, plus the necessary wedges, setting blocks and other attachments.

For more data circle 92 on Reader Service Card

★ ★ ★

## QUICK-ACTING VISE FOR HOLDING DUPLICATE PIECES

Heinrich Tools, Inc., Dept. 115-K, 1536 Clark St., Racine, Wis., has announced the Model 4CL Camlock Vise which is designed to speed up production in drilling, milling or general machine shop operations when a quantity of duplicate parts must be held. The operator can lock and unlock the quick-acting vise with one hand while inserting and removing pieces with the other hand.

A short horizontal movement of the locking lever securely clamps or releases the part. The vise can be easily converted into jig or fixture with the



**DRILL THESE HOLES**  
BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

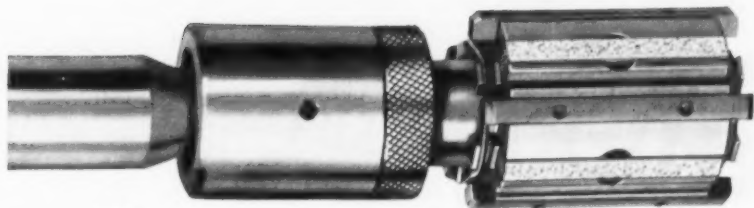
For more data circle 411 on Reader Service Card

December, 1955



# **BARNESDRIL**

## **HONING TOOLS and ABRASIVES**



### **check these features**

#### **✓ BODY SUPPORT**

— freer cutting action due to support of stone close to cutting edge. Less spalling.

#### **✓ GREATER STONE LIFE**

— more usable abrasive with Plas-T-Clad Stone design. Reduced downtime for replacement.

#### **✓ ELECTRONIC FEED**

— automatic compensation for stone wear, and maintains proper pressure between stone and work at all times.

**GET COMPLETE DATA IN CATALOG 500A**



## **BARNES DRILL CO.**

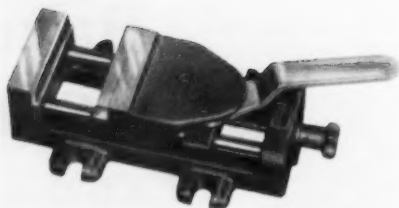
860 CHESTNUT STREET • ROCKFORD, ILLINOIS

For more data circle 412 on Reader Service Card



**new shop equipment . . .**

attachment of special jaws, bushing plates, and so on. Rugged yet simply designed, the camlock vise has 4-inch wide vise jaws which are infinitely adjustable to a 4 $\frac{1}{8}$ -inch opening, providing adequate space to accommodate a wide range of work and for attachment of jig and fixture components. Maxi-



**Heinrich No. 4CL Quick-Acting Camlock Vise**

# FEDERAL SHORT RUN STAMPINGS COST LESS



Federal's "secret" recipe  
for Cutting Costs



30 years of Short  
Run Stamping  
Experience

**KNOW HOW**

Engineering Skill

Creative Ingenuity

• Large, modern plant specializing in Short-Run Stampings.

• A vast "Library" of special Federal dies—to reduce your costs.

• Well Equipped . . . row after row of the latest, most modern, high speed precision machines.

• These are but a few of Federal's plus values—so valuable in cutting costs, and increasing speed and accuracy.

Send for Catalog 201 . . . Costs and materials are graphically illustrated. Tells where and how you can save money for your plant by using Federal Short Run Stampings.

**Federal** TOOL AND MANUFACTURING CO.  
3515 ALABAMA AVE. • MINNEAPOLIS 16, MINN.  
QUALITY STAMPINGS IN SMALL QUANTITIES

For more data circle 413 on Reader Service Card

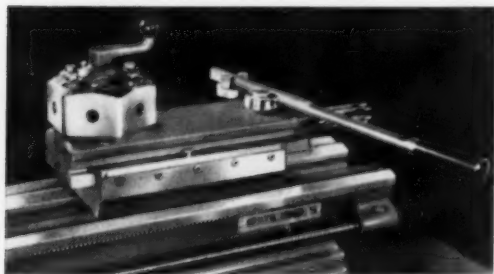
mum travel after setting is 5/16 inch. The vise is adjusted with a screw passing through the center of the vise. Controlled pressure permits holding with a light touch for fragile parts, to a tight 2,000 - pound squeeze for heavy-duty work.

According to the manufacturer, camlock design also provides wide clearance between jaw guides, permitting drilling clear through the work without interference. This permits ample chip clearance, assuring ease of loading and reduction of scrap caused by chips piling up under the part being clamped. Hardened and ground parallel bars are said to maintain perfect jaw alignment, and eccen-



# Simplify Repetitive Operations WITH **SOUTH BEND TURRETS**

Repetitive operations requiring close tolerances can be efficiently done with these quality-built, accurate lathe turrets. There are 165 other attachments, tools and accessories for South Bend Lathes that will help you do better tooling at lower cost. Write for Attachment Bulletin 5321.



## HANDLEVER BED TURRET

Mounts any place on bed. Indexes automatically  $\pm .0005"$  at 4" from turret face. Hardened, ground and superfinished index pin. Automatic feed stop for each position. Effective slide feed 4". Tool holes  $\frac{5}{8}"$  or  $\frac{3}{4}"$ . Two adjustable gibs on turret slide.

Size Lathe	Catalog No.	Price
9"	CL1611N	\$273.
Light Ten	CL1611K	280.
10"	CL1611R	286.
13"	CL1611T	308.

All prices f.o.b. factory



## HAND FEED TURNSTILE BED TURRET

For 13" and 16" swing lathes. Indexes  $\pm .0005"$  at 4". Superfinished index pin. Automatic indexing and feed stops. Slide feed  $5\frac{1}{8}"$ . Takes turret tools with  $1\frac{1}{2}"$  diameter shank. Price \$683.



## SQUARE TURRET TOOL BLOCK

for Compound Cross Slide

Mounts 4 cutting tools. Turret indexes within .0005" to 4 positions. Quick acting lever lock. Rocker adjustments for tool height.

Size Lathe	Catalog No.	Price
9" & 900	CL3375N	\$46.00
Light Ten	CL3375K	48.50
10" & 1000	CL3375R	52.00
13"	CL3375T	58.50
14 1/2"	CL3375F	84.00
16" & 16-24"	CL3375H	91.00

Compared with our costs  
**OUR PRICES ARE LOWER**  
than they were back in 1941



Prices are closely tied to costs. Costs are still rising. Buy now before increased costs necessitate higher prices.

### SEND INFORMATION CHECKED:

- ☐ 9" and 10" BENCH LATHES
 ☐ 10" to 16-24" FLOOR LATHES
 ☐ DRILL PRESSES
 ☐ TOOL GRINDERS
 ☐ 1/2" & 3" Collet TURRET LATHES
 ☐ 7" BENCH SHAPERS

Name \_\_\_\_\_ Company \_\_\_\_\_

Street \_\_\_\_\_ City & State \_\_\_\_\_

Building Better Tools Since 1906 • **SOUTH BEND LATHE** • South Bend 22, Indiana

For more data circle 414 on Reader Service Card



**Raise it! Lower it!**



**Increase production...**

**RAYMOND** PORTABLE  
**ELEVATING TABLE**

Keep materials at right height for working with a RAYMOND Portable Elevating Table. Elevates and lowers hydraulically—use it for die handling, sheet feeding, work positioning, supporting overhanging work.

30" square top rotates or locks when desired. Foot pedal operation frees hands. Floor lock holds it in place. Standard model elevates 28" to 44"; Telescopic model, 28" to 50". Both have 2,000 lb. capacity. Send for Portable Elevating Table bulletin.

**The RAYMOND CORPORATION**

8839 Madison St., Greene, N. Y.

For more data circle 415 on Reader Service Card

222 modern machine shop

**new shop equipment . . .**

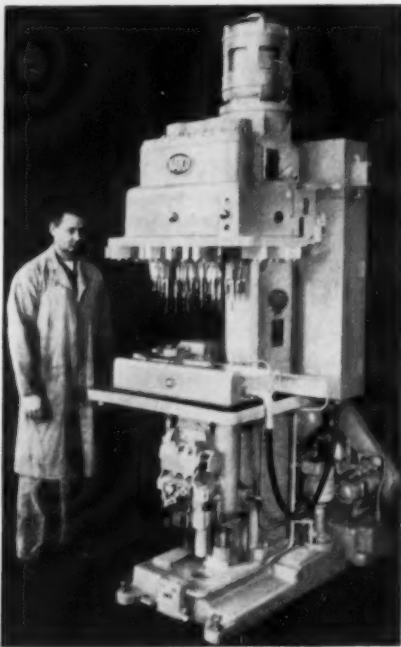
tric parts are hardened to assure long life. Built-in recessed parallel jaw inserts hold the work square with the machine at all times. A hardened and ground V-block accessory is available for use in obtaining a firm grip on both round and oval shaped parts.

For more data circle 93 on Reader Service Card

★ ★ ★

**DRILL COMBINES OPERATIONS  
OF THREE MACHINES IN ONE**

Designated as the H-6, a drilling machine which is said to combine the operations of three machines in one has been announced by National Automatic Tool Co., Inc., Richmond, Ind.



**Natco H-6 Drilling and Tapping Machine**

December, 1955



There's an **IDEAL**  
**LIVE CENTER**  
 to do YOUR job best!

**STANDARD MODELS IN A COMPLETE  
 LINE DELIVERED FROM  
 DISTRIBUTORS STOCKS!**

When you choose IDEAL Live Centers you seldom have to resort to "specials" and the slow delivery and inventory problems they involve. You can handle practically any turning job with a *standard* IDEAL Live Center.

Top performance is also "standard" with IDEAL Live Centers. They have proven their accuracy and long life in tough service in shops all over the country where they are first choice! When you need a live center, you'll get the one you want, when you want it, easiest, from the complete IDEAL Line, stocked by your IDEAL Distributor.



**UNIVERSAL**

Accuracy to plus or minus .0001". Unusually high load capacity up to 5200 lbs. at 50 RPM. Morse tapers 2, 3, 4 and 5.\*

**\*IDEAL LIVE CENTERS ARE ALSO  
 AVAILABLE IN BROWN &  
 SHARPE AND JARNO TAPERS**

Sold through Leading Distributors  
 In Canada: Irving Smith, Ltd., Montreal



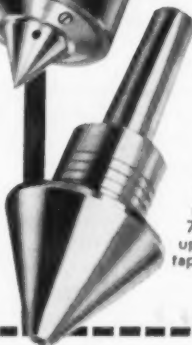
**MULTI-DUTY**

Interchangeable male, female and pipe points for centered and un-centered work. Nine sizes: Morse tapers 1 through 5, as well as straight.\* Loads to 1500 lbs. at 100 RPM.



**HEAVY DUTY**

For close tolerance turning jobs to 22,000 lbs. at 50 RPM. Eccentricity less than .0002". Morse tapers 4, 5, 6 and 7.\*



**NEW  
 PIPE POINT  
 LIVE CENTER**

For heavy turning work on pipes and other large, hollow cylinders. Sizes range from 3" diam. to 7 1/2" diam. Load capacities up to 22,000 lbs. Morse tapers 3, 4, 5, 6 and 7.\*

**IDEAL INDUSTRIES, Inc.**  
 1031 Park Avenue, Sycamore, Illinois

Please send free catalog data on IDEAL Live Centers

NAME.....

COMPANY.....

ADDRESS.....

CITY.....ZONE.....STATE.....

For more data circle 416 on Reader Service Card



## new shop equipment . . .

According to the manufacturer, the light sensitive, adjustable, multi-spindle driller and tapper with a three-position automatic fixture slide drills, chamfers and then taps holes automatically.

A typical feed cycle of the Natco H-6 is as follows: Position No. 1—drill,

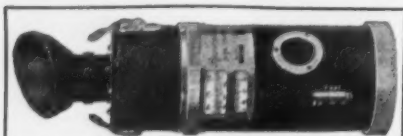
load part, rapid traverse, feed forward, rapid reverse, and index to Position No. 2; Position No. 2—chamfer, rapid traverse, feed forward, rapid reverse, and index to Position No. 3; and Position No. 3—tap, rapid traverse, feed forward, feed reverse, rapid reverse, and index to Position No. 1.

For more data circle 94 on Reader Service Card

★ ★ ★

## ANGLE PLATE IS SELF-PROVING

An angle plate, made of diabase (black granite), on which the accuracy of each 90-degree angle can be proved without reference to any so-called master has been announced by Rahn Granite Surface Plate Co., 636 N. Western Ave., Dayton 7, Ohio. Due to the extreme hardness and stability of the diabase, the angle plate, it is claimed, will retain its accuracy over an unusually long period of time and may be readily checked at any time to prove that it has not changed. Due to the



The simplified PYRO Optical is the Ideal Instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3 1/2 lbs.) and FOOL-PROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS, Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 85

THE PYROMETER INSTRUMENT CO.

New Plant and Laboratory, Bergenfield 42, N. J.

For more data circle 417 on Reader Service Card

**Get a better "SURFACE GRINDER" job at less cost**  
**QUICKEST AND EASIEST SETTING TOOLS ON THE MARKET**

**RADIUS DRESSER \$39.00**

Diamond \$7.00



**ANGLE DRESSER \$44.00**

Diamond \$7.00



**ORDER DIRECT**  
on our 10 day  
money back  
guarantee

### Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.  
Diamond always perfectly centered.  
Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders—\$44.00. Diamond \$7.00.

SPECIAL 20" Wheel Size \$110.00.

Ball Thrust Bearing. 24  
Precision Ground Surfaces. Can be set  
very accurately with a Protractor or  
Sine Bar. Works underneath the wheel.  
Large bearing surfaces.

### The "Mighty Midget" Line

SPERMAN METAL SPECIALTIES • 2199 E. 21st ST. • BROOKLYN 29, N. Y.

DUE TO CIRCUMSTANCES BEYOND OUR CONTROL WE MUST RAISE PRICES JAN. 1st.

For more data circle 418 on Reader Service Card





**spot the champ**

**... and with high speed steels  
the champion's always REX**

Compare the freckles and you'll pick the champ. And it's easy to spot the champ in high speed steels, too, for Crucible REX® has been the *standard of comparison* for over half a century.

Prove the reasons for REX's superiority in your own shop. You'll like its hardenability . . . response to heat treatment . . . fine tool performance. Like thousands of other users, you'll agree *you can't find a high speed steel to outperform REX.*

Ask for REX, a *prescription-made* Crucible product, at Crucible warehouses or leading distributors from coast to coast. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pennsylvania.*

**CRUCIBLE**

first name in special purpose steels

**Crucible Steel Company of America**

For more data circle 419 on Reader Service Card

December, 1955

modern machine shop 225



## **new shop equipment . . .**

fact that no compensating hump will be raised when accidentally nicked, there is said to be no danger of an unnoticed burr causing an error during an inspection.

According to the manufacturer, the angle plate has been found to be very useful as a master on which to

quickly grind iron production angle plates which are used on magnetic chucks.

For more data circle 95 on Reader Service Card

★ ★ ★

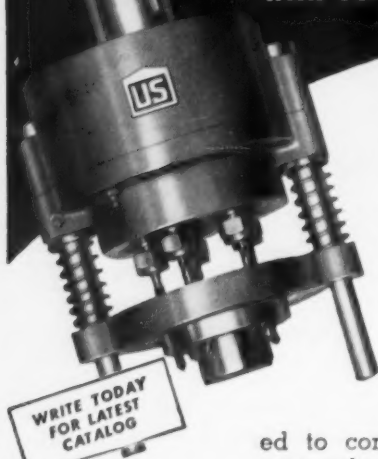
## **MECHANICAL SEAL FOR USE ON PROCESS PUMPS**

The Garlock Packing Co., Palmyra, N. Y., has announced a new series of

Unitary Mechanical Seals which are designed for use on process pumps. According to the manufacturer, the entire unit, including the sleeve and gland, is self-contained, ready for quick installation, and no on-the-job measurements or adjustments are necessary as the seal is preset at the factory.

The seal is claimed to feature a collet type drive; there are no set screws to loosen, corrode or damage the shaft or shaft sleeve. The external lock and drive are said to be eas-

## **You are missing a bet! Use U. S. DRILL HEADS with Turret Lathes . . .**



Manufacturers of all types of fixed center and individual lead screw tapping heads.



SINCE 1915

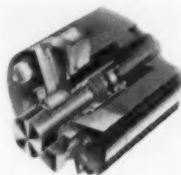
## **UNITED STATES DRILL HEAD CO.**

616-618 Burns Street, Cincinnati 4, Ohio

**M**ultiple Spindle Drill Heads have many uses, yet oftentimes they are not considered as being applicable to automatic turret lathes.

If you want to reduce labor costs and the number of operations required to complete a particular part, why not see how U. S. Drill Head engineers can help. Write or wire us today. There's no obligation, and the chances are that we can save you time and money.

For more data circle 420 on Reader Service Card



Garlock Unitary Seal





**New GA batch type** controlled atmosphere furnace designed for tool rooms and small production. 2 models now ready—others to follow.

# Cooley

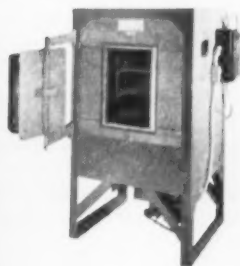
**ELECTRIC HEAT  
TREATING FURNACES**

**35 Models**

**WITH AND  
WITHOUT**

*Controlled  
Atmosphere*

**ELECTRIC OVENS**

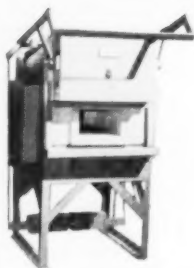


**Recirculating Air Draw:** box type furnace for controlled heating to 1300° F.—steel tempering, glass annealing, etc. 8 sizes to 24" w. x 15" h. x 48" d.



◀ **Bench Type:** for tools and small parts—to 2000° F. 14 sizes to 10" w. x 8" h. x 18" d.

**Recirculating Ovens:** for drying, finishing and industrial processing to 600° F. 5 sizes to 36" w. x 36" d. x 60" h.



◀ **High Temperature Box Furnace:** for high speed steel treating to 2500° F. 3 sizes to 12" w. x 8" h. x 24" d.

**Industrial Box Furnace** for general heat treating—to 2000° F. 8 sizes to 24" w. x 18" h. x 48" d.



Catalog and complete information on any of these furnaces will be gladly furnished on request.

**COOLEY ELECTRIC MANUFACTURING CORPORATION**

34 S. SHELBY ST. • INDIANAPOLIS 7, INDIANA

For more data circle 421 on Reader Service Card



## new shop equipment . . .

ily accessible. Circulating connections in the glands provide cool, clean lubrication to add further life to the seal. All sealing faces are precision lapped, and all high-pressure seals are pressure balanced.

The Garlock Unitary Seal is designed for use on rotary shafts of boiler feed

pumps, chemical pumps, oil refinery pumps, digester circulating pumps and other process pumps.

For more data circle 96 on Reader Service Card

★ ★ ★

## TOOL POST HOLDER FOR PNEUMATIC GRINDERS

Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill., has introduced a tool

post holder for pneumatic grinders which is designed to assure maximum accuracy when using the grinder for a wide variety of jobs on a lathe. Made of 9/16-inch cadmium rolled steel, the tool post holder is manufactured especially for use with the Mall Model PG-K-1030B and the Model PG-K-1030L midjet pneumatic die grinders. This pair of midjet pneumatic die grinders operate at 30,000 r.p.m. and feature a rotary-type motor, capable of being used with a A-shape mounted bracelet point. Built to withstand the rigorous strain of steady production operations, the grinders have unusual power, precision and handling ease. Also, the mid-

# NEW FOSTORIA 20th Anniversary LOCALITES

NEVER BEFORE  
A LIGHT  
LIKE THIS!

for Machine Tools,  
Assembly, Inspection  
MODEL 66-BP-701

\$863  
Each  
in Std.  
Pkg. of 4  
List \$10.15 ea.

Direct Light  
Exactly  
as you  
want it



### SENSATIONAL NEW FLEXIBILITY

**NEW Universal Arm Joints** — Bend 135°. Large frictional triple disc bearing surface. Smooth, easy movement. Instantly adjustable by hand to direct light exactly as needed.

**NEW Collar Disc Joints** — Rotate 180°. Combination of 135° bend joints and 180° rotating joints provides amazing articulation for positioning reflector.

**NEW Reflector** — Parabolic design with 6 1/4" orifice. Accommodates 100 watt A-21 lamp. Available with lens.

**NEW Base** — Universal for horizontal or vertical mounting. Outlet box base optional.

**NEW Wiring** — Heavy duty Levolor Socket interior in high impact plastic shell with Velumoid lamp seal. 8 ft. SPT-2 18/2 heavy duty plastic rip cord with molded plug.

**NEW Finish** — Semi-gloss Vista Green baked enamel. Reflector interior, high temperature White.

Also  
Available  
with  
one  
arm

WRITE for Complete  
Catalog of Localite  
models for every  
industrial use.



THE FOSTORIA PRESSED STEEL  
CORPORATION • Fostoria, Ohio

Localites are available through  
wholesalers everywhere.



For more data circle 422 on Reader Service Card



**in MILL HEADS**

**RUSNOK**

*Builds the BEST Quality  
at the BEST Price*

**1/4 H.P. CONVERTICAL MILL HEAD**

Only low cost mill head with quill travel attachment.  
High speed medium-light operation.  
For bench, floor and pedestal mills.  
Fits milling machines with overarm 1 1/2" to 3".  
3/8" end mill capacity.

**\$24500**



**RUSNOK**

**1/2 H. P. MILL HEAD**

HEAVY DUTY MILLING ATTACHMENT  
Fits milling machines with 3" to 5" overarm.  
3/4" end mill capacity.  
For vertical, horizontal and angular operations.

**1 H. P. MILL HEAD**

HEAVY DUTY MILLING ATTACHMENT  
Fits milling machines with 3" to 5" overarm.  
3/4" end mill capacity.  
For vertical, horizontal and angular operations.

**RUSNOK**

**RUSNOK TOOL WORKS**

4840 West North Ave., Chicago 39, Ill.

DEALERS IN ALL PRINCIPAL CITIES

**MILLING • DRILLING • BORING**

For more data circle 423 on Reader Service Card

December, 1955

modern machine shop 229





TO BE SURE OF  
QUALITY  
Remember  
the Name

# HOGGSON

**STEEL  
STAMPS**



**FINEST  
STEEL**

long  
life

CHAMFERED  
CORNERS  
*for locating  
the base*

ALSO IN  
REVERSE  
FOR  
MOLDS  
& DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

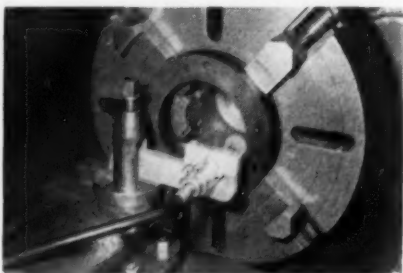
**HOGGSON & PETTIS MFG. CO.**

New Haven 7, Connecticut

For more data circle 424 on Reader Service Card

230 modern machine shop

**new shop equipment . . .**



*Mall Tool Post Holder for die grinders*

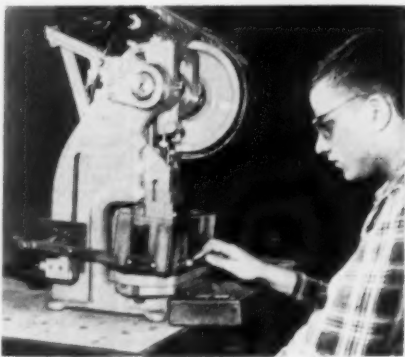
get pneumatic die grinders are supplied equipped with the new Mall "noise silencer" which is said to eliminate all objectionable high-pitched tones.

For more data circle 97 on Reader Service Card

★ ★ ★

## ELECTRO-SOLENOID DROP GATE GUARD FOR USE ON PUNCH PRESSES

Searjeant Metal Products, Inc., 87 Pittsford Rd., Mendon, N. Y., has announced the addition of a drop gate



*Searjeant Electro-Solenoid Drop Gate Guard*

December, 1955





How many operations are required  
to produce threaded parts of

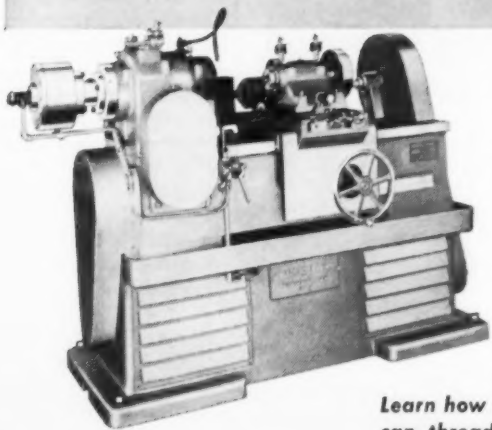
**NON FERROUS METALS  
HEAT TREATED MATERIALS  
OR VERY SHORT RUNS**



ONLY **ONE** WITH A

**COULTER  
HOB THREAD MILLING MACHINE**

and it does 'em faster, ***AUTOMATICALLY!***



The greater range of speeds and feeds found *only* in a COULTER "H 1", plus the advantage of quality control (even with quick-change-over short runs) makes COULTER a *must* in your shop for fast production of precision internal and external right-hand and left-hand threaded pieces.

*Learn how all the exclusive "H-1" features  
can thread better, faster—automatically.  
Inquire today!*

**MACHINE TOOL BUILDERS SINCE 1896**

**The *James*  
Coulter Machine Co.**

**641 Railroad Ave., Bridgeport, Conn.**

For more data circle 425 on Reader Service Card



## **new shop equipment . . .**

electro-solenoid guard to its line of punch press safety equipment. The barrier is said to be so designed that it surrounds the die area when in the down position.

Incorporated in the guard is a positive electric control for the operation of the press and a built-in single

stroke attachment. The downward action of the gate causes a switch to energize a solenoid which is used to trip the press. The upward action of the guard resets a relay, mounted in the control panel, so that the press can be retripped on the next downward action of the gate.

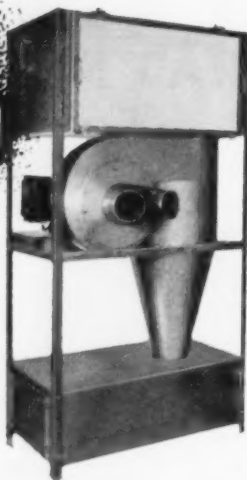
According to the manufacturer, a fine adjustment of the guard can be attained so that the press will be put into action only when the barrier is within  $\frac{1}{8}$  inch or less of the bolster plate.

The guard is supplied prewired, ready to attach to the press. The installation is said to be very simple, and requires little attention once it is installed. The safety unit is available for all sizes of presses from bench type up to presses of 100 tons and over. For presses of approximately 30 tons and over, the press clutch mechanism is activated by an air cylinder, in which case the downward action of the guard causes the current to operate a solenoid air valve when the guard touches the bolster plate. The single stroke feature is also available with the air operated clutch

## **EFFICIENT-LOW COST**

# **Dust Collection**

Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . . that are space saving, self-contained units, or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.



**37 STANDARD MODELS  
TO CHOOSE FROM**

**• READY TO USE**

**Also a Complete Line of Mist Collectors**

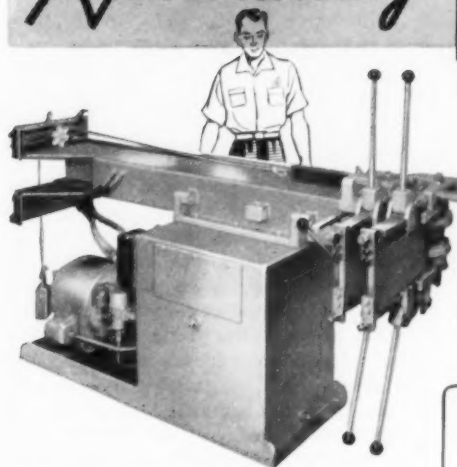
**AGET MANUFACTURING COMPANY**  
1398 E. CHURCH ST. • ADRIAN, MICHIGAN

For more data circle 426 on Reader Service Card

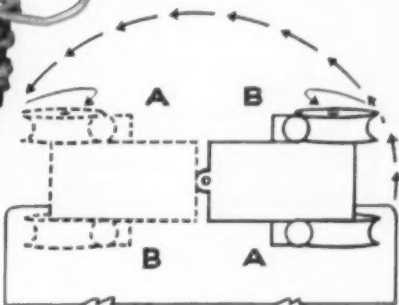


# Announcing

## NEW PINES 2-WAY BENDING MACHINE



Schematic view showing how unitized head and top assembly rotate 180° to permit bending in opposite directions.



### HANDLES *Both* CLOCKWISE AND COUNTER-CLOCKWISE BENDING OPERATIONS

Now, with the new Pines 1400-A Two-Way Bending Machine, you can handle bending operations in either clockwise or counter-clockwise (left or right-hand) direction. This new standard semi-automatic machine is designed with a unitized head and top assembly double-hinged to the base, which makes it possible to turn over the entire assembly 180°. The stationary and swinging arms have double ways for mounting both clamping and forming tools. Versatility is built into the machine to especially serve small lot bending requirements where multiple planes and odd shapes make it difficult to handle all operations with a single setup.

#### Complete Changeover in Two Minutes

The exclusive features built into this new Pines Bender permit double tooling setups and quick and easy changeovers. With tooling mounted on both the top and bottom ways of the stationary and swinging arms, a complete changeover from left to right-hand bending can be made in two minutes. Typical production rates are 300-400 bends an hour. This low cost machine has capacity for tubes up to 1" diameter.



## PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery 643 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

#### Write For FREE DATA

If you have a variety of small lot bending work, or need a highly versatile small bender, it will pay you to get complete facts today on this new Pines Two-Way Machine. Write today for free literature.

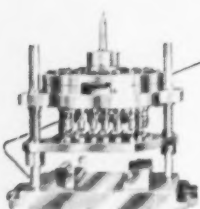
For more data circle 427 on Reader Service Card



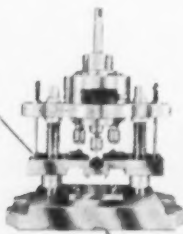
FOR MULTIPLE DRILLING OF HOLES  
ON PRODUCTION RUNS . . .

## ERRINGTON

FIXED CENTER DRILLING HEADS  
with JIGS and FIXTURES



*Custom Built  
to Your Specifications.  
Send Blueprint for  
Quotation Without  
Obligation.*



Do more . . . and do it better with Errington Fixed Center Drilling Heads. They drill any number of varied size holes on different elevations. The head has grooved thrust ball bearings at all thrust points and hardened bronze radial bearings. Heat treated spindles and gears, of one piece turned from solid bar stock. It is geared approximately 2:1. All enclosed in a sand-cast aluminum case and cover, with alenite pressure lubrication.

Send for Complete Catalog

**ERRINGTON Mechanical Laboratory, Inc.**

Established 1891

Main Office and Plant, STATEN ISLAND 4, NEW YORK

For more data circle 428 on Reader Service Card

### new shop equipment . . .

mechanism. The guard may be actuated either by hand, when used on small bench-type presses, or by foot, when used on larger presses.

For more data circle 98 on Reader Service Card

★ ★ ★

### DUST COLLECTORS ARE EQUIPPED WITH CASTERS

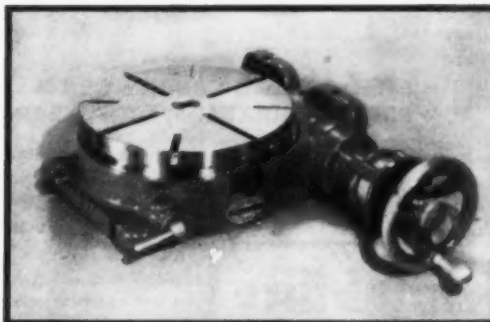
Torit Mfg. Co., 296 Walnut St., St. Paul 2, Minn., has announced that all its dust collectors of both the cabinet and cyclone types are now available with casters as optional equipment. Even though the units can now be moved from one location in the plant to another for intermittent use on particle, powder, fume and dust creating equipment, the addition of casters will permit the collectors to be moved more easily, quickly and quietly. The casters are made of hard rubber, 3 inches in



**Torit Model 66 Cabinet-Type Dust Collecting Unit** equipped with hard rubber casters



**For angular spacing jobs so precise  
you could never handle them before**



**A Rotary Table  
accurate to  
 $\pm 3$  sec. in  $360^\circ$   
(USING CHART)**

**No. 2 Moore 11-Inch Rotary Table, developed by the builder of the Jig Borer and Jig Grinder.**

**THE FOLLOWING ACCURACY  
BUILT FOR SHOP USE:**

All points in  $90^\circ$  increments, from zero,  $\pm 1\frac{1}{2}$  sec.

All points in  $18^\circ$  increments, from zero,  $\pm 2$  sec.

All points in  $2^\circ$  increments, from zero,  $\pm 4$  sec.

Worm accuracy,  $\pm 1$  sec.

Repetition of settings,  $\pm 1$  sec.

4 sec. = .0001" on 10" dia.

How many jobs have slipped by you because the angular spacing requirements were just too much for your equipment?

With Moore's new 11-Inch Rotary Table, you can easily handle the most precise angular measurements. Having an overall performance accuracy of  $\pm 6$  seconds throughout the entire  $360^\circ$ , this table is already being used successfully by several leading companies on government-sponsored precision jobs never before accomplished.

This extreme accuracy is achieved by a non-disengagable, thread-ground worm, combined with accurately spaced teeth of its mating gear. An ultra-sensitive method of angular measurement—interferometric inspection and calibration—used industrially for the first time, assures tooth spacing accuracy within less than  $\pm 4$  seconds.

You can use this rotary table for countless precision spacing applications on jig borers and jig grinders. Examples: Spacing holes in a circle on either machine; set at right angle for additional machining and inspection jobs; with its companion unit, the new No. 2 Sine Plate, to produce compound angle settings. Write today for Bulletin RT2.

**MOORE SPECIAL TOOL COMPANY, INC.**


730 Union Avenue, Bridgeport 7, Connecticut



*Accurate in vertical as well as horizontal position. Additional vernier permits normal reading even in vertical position.*



*Accuracy assured by interferometric inspection and calibration. This is the first time industry has used light-wave measuring methods for precise division of the circle.*

**ADD  TO YOUR TOOLROOM**

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • PRECISION ROTARY TABLES • HOLE LOCATION ACCESSORIES

For more data circle 429 on Reader Service Card

December, 1955

modern machine shop 235



## new shop equipment . . .

diameter and 1 inch wide, for smooth rolling. Two of the casters in each set are provided with locks, and all are welded to the bottom of each unit at the factory. Seventeen Torit dust collectors and their adaptations are affected by the development of this accessory, ranging from the 160-pound Model 54 to the 1,130-pound Model

122, although they will undoubtedly prove more popular for the smaller machines in the line.

For more data circle 99 on Reader Service Card

★ ★ ★

## STEEL CUTTING CARBIDE GRADES PROVIDE MAXIMUM EDGE WEAR

Designated as CA-606 and CA-609, two new steel cutting carbide grades which were developed to give maximum

edge-wear, without loss of shock resistance, have been announced by Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 20, Pa. The grade 609 is designed for medium, heavy machining where cuts are in excess of 1/16 of an inch and where the application requires more resistance to wear. The CA-606 has a high resistance to edge wear, as well as resistance to heat, and is especially useful where machining tolerances must be held.

These grades are also made with the new anti-cratering ingredient called Crystalloy. Crystalloy uses titanium metal in place of titanium oxide to gain maximum impact strength and get maxi-

## Economy • Dependability

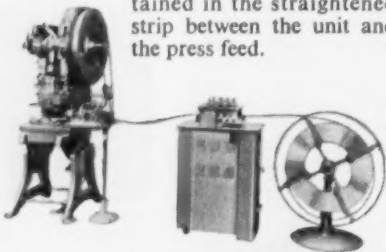
### WITTEK STOCK STRAIGHTENERS

Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.



This typical Wittek automatic production feeding setup includes

—Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.



Write for full particulars

**WITTEK Manufacturing Co.**

4322 W. 24th Place • Chicago 23, Illinois

Production  
Feeding  
Equipment

5577



For more data circle 430 on Reader Service Card



# Sharp Clean Cuts EVERY TIME

Many thicknesses and sizes of metal are cut on this Steelweld Shear every day. Thanks to Steelweld's exclusive MICRO-SET knife adjustment, it is easy to set the knife clearance to the exact amount which will produce the best cut for every plate run through the machine.

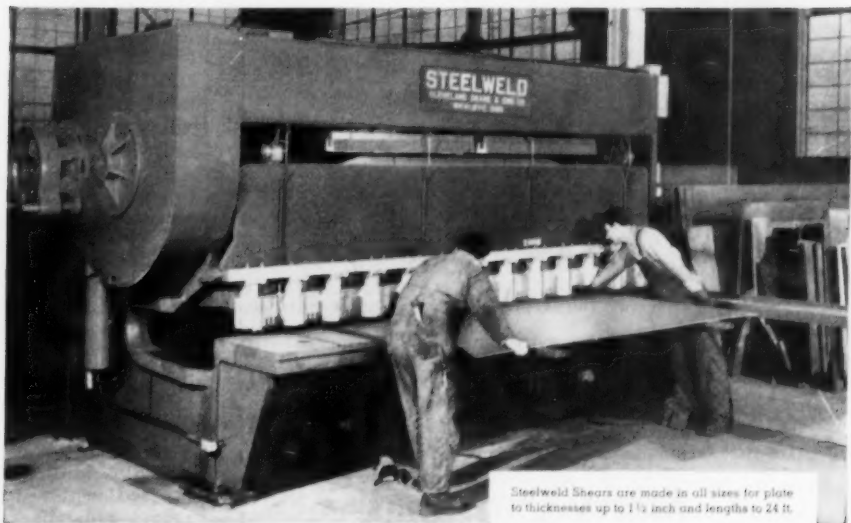
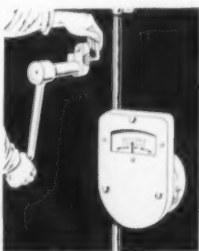
If desired, the knife clearance can be set for an average thickness and all plates cut without changing the clearance. This procedure is used with most shears because to change knife clearance on them is a tedious, difficult operation which usually puts a machine out of service for hours.

In contrast, knife adjustment on Steelwelds is made in a few seconds. It's simply a matter of turning a crank until an indicator points to the figure representing the thickness of plate being cut. No bolts to loosen; no parts to move. There is no need for using "average" knife settings.

The clutch and brake unit is another outstanding feature of Steelweld Shears. As it is air-operated, it is quick, snappy in action. Its low-inertia design assures cool operation, even after long continuous production runs, because energy to be dissipated is minimized and working pressure necessary on clutch and brake facings is greatly reduced.

The many features of Steelweld Shears make it worth your while to get all the facts.

## Because of MICRO-SET Knife Adjustment



Steelweld Shears are made in all sizes for plate to thicknesses up to 1 1/2 inch and lengths to 24 ft.



GET THIS BOOK!

CATALOG No. 5011 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.

6446 East 282 Street, Wickliffe, Ohio

# STEELWELD PIVOTED BLADE SHEARS

For more data circle 431 on Reader Service Card



## **new shop equipment . . .**

mum crater resistance. According to the manufacturer, the titanium carbide has better solvent properties for tungsten carbides; makes possible a mixed crystal which contains less titanium carbides; and makes possible a multi-carbide which does not dissociate at sintering temperatures. The new

grades are available in all standard tips and tools and can be made into any special blanks of any shape or size.

For more data circle 100 on Reader Service Card

★ ★ ★

## **STRONG ABRASIVE WHEEL FOR USE ON PORTABLE GRINDERS**

A construction feature designed to impart extra strength and safety to

high speed abrasive wheels has been incorporated in the "Simex" Red Wheel recently developed by Simonds Abrasive Co., Philadelphia 37, Pa. According to the manufacturer, this improvement is a special safety web backing of spiral wound rayon automobile tire cord. The "Simex" Red Wheel is a lightweight, rigid-type reinforced resinoid bonded abrasive wheel for use on portable disc-type and right-angle type portable grinders. It is available in depressed center or raised hub shape in 7 and 9-inch diameters by 3/16 and 1/4-inch thicknesses. The wheel's field of application is for production grinding, especially for grinding



**T**HE year has been good to us—as we hope it has been to you—and in appreciation for all its blessings we pause from concerns of business to extend to our customers and friends the old but sincere double wish—

**Merry Christmas  
and Happy New Year**

**THE WELDON TOOL COMPANY**

3000 Woodhill Road

Cleveland 4, Ohio



For more data circle 432 on Reader Service Card





**PRODUCTION FACTS:** Mill two locking lug recesses in bevel gear blanks in one pass.

## 50,000 Monthly Production with GORTON ROTARY DUPLICATOR

Four spindles operate in pairs with their respective rotating fixtures so that the operator unloads and reloads one pair of fixtures while the other two cutters mill two recesses in each of two beveled gear blanks.

Milling operation is mechanical — no electronic, hydraulic or pneumatic controls are used other than air operated clamps.

### CAN PERFORM TWO DIFFERENT OPERATIONS AT THE SAME TIME

Each pair of fixtures is controlled by one of two masters mounted within the table. When one pair of spindles is lowered to fixed depth and the cycle starts, the rotation of fixtures and cross movement of table feed the work to the cutters to produce the desired shape. One pair of spindles can perform one operation on two pieces while the other pair performs a different operation on two other pieces.

**EASILY MODIFIED TO MEET YOUR NEEDS...**

## ADDITIONAL TOOLS by GORTON

### PANTOGRAPHS

Five models of 2- and 3-dimensional machines for engraving, profiling or die sinking — either manually operated or tooled for automatic cutting cycle operation.

### SUPER-SPEED VERTICAL MILLS

Three sizes, designed for fine work in the machine shop, tool room and in die and mold shops.

### DIE AND MOLD DUPLICATORS

Three sizes of manually operated precision duplicators — also multiple spindle models, either manual control or automatic cutting cycle.

### Super-Speed

### HORIZONTALS, UNIVERSALS, VERTICALS

Six models, featuring 56" tables (28" travel), 62" tables (34" travel) or 76" table (48" travel).

### SWISS-TYPE AUTOMATIC SCREW MACHINES

For high production turning of small slender parts to high precision standards.

## MACHINES FOR HIGH PRODUCTION

### MULTIPLE-SPINDLE ROTARY DUPLICATORS

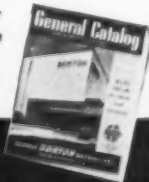
### MULTIPLE-SPINDLE INDEXING PANTOGRAPHS

For multiple operations at production rates with high repetitive accuracy.

### MULTIPLE-HEAD ETCHERS

For permanently marking hardened or finished parts.

Write for Complete Catalog  
1655-1712.



**GEORGE GORTON MACHINE CO.**

1712 Racine Street • Racine, Wisconsin • U. S. A.

**SINCE 1893** Tracer-Controlled Pantographs, Duplicators — standard and special... Horizontal and Vertical Mills, Swiss-Type Screw Machines, Tool Grinders, Small Tools and Accessories.

For more data circle 433 on Reader Service Card

A 8218-1PA

December, 1955

modern machine shop 239



## new shop equipment? . . .

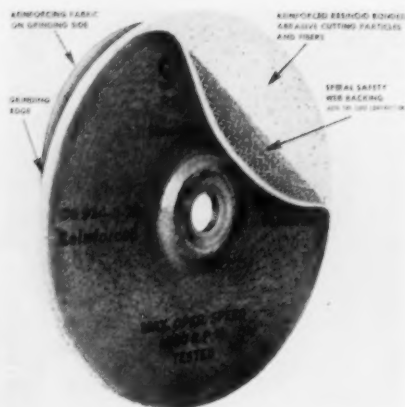
welds, removing flash and bead, cleaning up rough, ragged surfaces and edges and for all types of stainless steel. The fast abrasive cutting action of the wheel is said to permit heavy stock re-



Specializing in Stainless Steel  
Standard and Made to Order Precision Parts  
Send Your Blueprints for Prompt Quotations

**PEASLEE METAL PRODUCTS CO.**  
470 Tolland St.  
EAST HARTFORD, CONN.

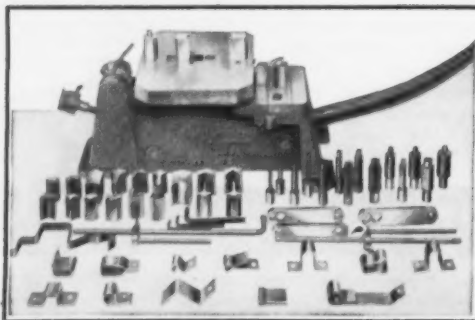
For more data circle 434 on Reader Service Card



Simonds "Simex" Red Abrasive Wheel

moval, and its durable construction provides unusually long wheel life.

The wheel itself is made like a conventional grinding wheel—from a wheel mix consisting of abrasive cutting particles and synthetic resin bonding agents, reinforced with alpha cellulose fibers criss-crossed and knitted together throughout the wheel mass. In addition to the extra safety web backing on the top side, the under or grinding side is further strengthened with a layer of reinforcing fabric. This combination, it is claimed, provides equal and added strength in all directions of force applied on the wheel. There is a knurled



## Multiform BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Clamps, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, Steel Rule Dies, Etc.

**AIR OR HAND MODELS FOR UP TO  
1/4" to 4" MATERIAL**

Write for brochure which illustrates  
and describes the four bender models.

**J. A. RICHARDS CO.**

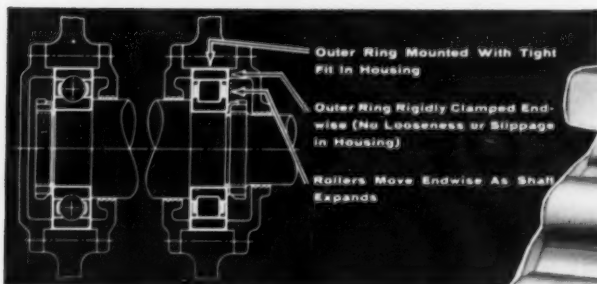
Dept. 6-M

Kalamazoo, Mich.

For more data circle 435 on Reader Service Card



# For Shaft Expansion *and/or* Heavy Radial Load use **NORMA-HOFFMANN** Precision Cylindrical Roller Bearings

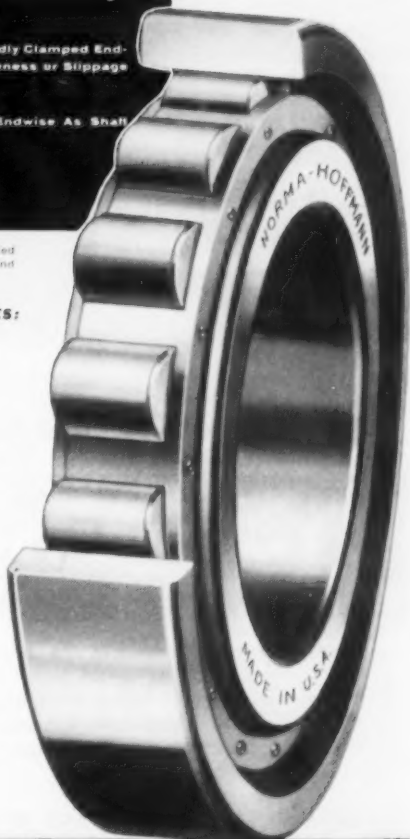


Typical Mounting Using Clamped Ball Bearing At Lightly Loaded End Of Shaft And Clamped Roller Bearing At Heavily Loaded End

## CHECK THESE ROLLER BEARING ADVANTAGES:

1. No Looseness Required Between Outer Ring and Housing — As With Self-Contained Bearings.
2. No Possibility of Endwise Cramping of Bearings — A Frequent Cause of Heating and Early Failure.
3. Extra Quiet and Trouble Free Operation — Due to Elimination of Looseness.
4. Extra Heavy Radial Load Capacity Plus Resistance to Shock and Vibration.
5. Precision Limits Used Throughout Permit Extra High Speed Operation.
6. Interchangeable With Standard Single Row Metric Ball Bearings.
7. Available Also in An Extra Light Series Where Overall Weight Is Important.

Norma-Hoffmann Engineers, specialists in bearing design and application, will help you with your problems. Ask for their services.



**NORMA-HOFFMANN**  
*Precision* **BEARINGS**  
**BALL - ROLLER - THRUST**

NORMA-HOFFMANN BEARINGS CORPORATION  
STAMFORD, CONNECTICUT - FOUNDED IN 1911

FIELD OFFICES: Atlanta, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Kansas City, Los Angeles, San Francisco, Seattle

For more data circle 436 on Reader Service Card



## new shop equipment . . .

or file-type pattern on the grinding or cutting side of the wheel to increase cutting action. With the "Simex" wheel for weld grinding work, the leading edge of the wheel is used at about a 30-degree angle with the work, actually cutting away the excess metal. Finishing or cleaning up is then accomplished

with the grinding side of the wheel being held at approximately a 15-degree angle with the work.

For more data circle 101 on Reader Service Card

★ ★ ★

## LIVE CENTER FEATURES CARBIDE TIP

Herbert Cross & Son, 14 Highland Ave., Bala-Cynwyd 39, Pa., has announced a line of

five centers which feature tungsten carbide tips. According to the manufacturer, this new design feature increases the life of the center from 5 to 10 times by retaining a plus or minus 0.0001-inch accuracy. The center was developed especially to withstand the higher speeds and increased pressures set up by carbide cutting tools. Twin radial and thrust-load ball bearings in the head and twin radial-load needle bearings in the shank are claimed to provide the live centers a two to three-times greater load capacity and minimize spindle deflection, chatter and loss of accuracy. The carbide-tipped live center is available with a

**LESS  
REBOUND**  
per pound



thanks to  
**"Contact Control"**

**C/R Jawhead**  
the best "soft" hammer you can buy!

Special processing controls the rebound for longer striking contact. This means more work with fewer blows, less fatigue. Faces won't mar surfaces, slip, chip, fly off or change with extreme temperatures or use. Cost less, too, and last longer — are safer for work and worker.



• Available from  
your local industrial  
supplier.

**CHANGE FACES IN SECONDS —**  
Threaded collar locks them in.

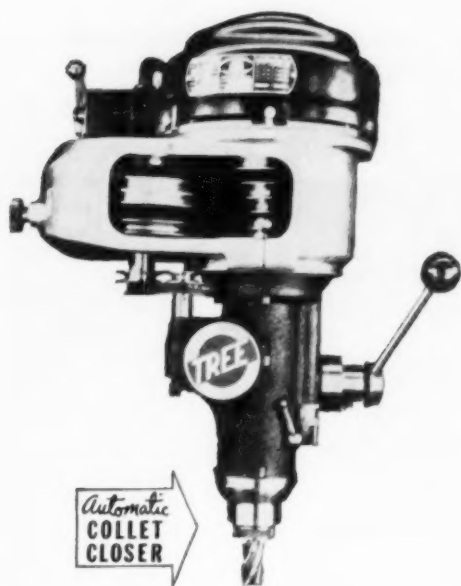
**CHICAGO Rawhide MFG. CO.**

1301 Elston Ave., Chicago 22, Ill.  
In Canada: Super Oil Seal Mfg. Co., Ltd.,  
Hamilton, Ontario

For more data circle 437 on Reader Service Card



# do you need . . . VERTICAL MILLING CAPACITY?



You can add vertical milling capacity by adapting the versatile TREE MH-4 Vertical Milling Attachment to your present horizontal milling machine. The MH-4 gives you all angle milling, drilling and boring with a high degree of accuracy because of its built-in rigidity. Spindle — alloy steel, hardened and ground Roller drive eliminates back-lash. Quill — 4 inch travel. Enclosed micrometer depth stop. Power feed. Write today for full information.

Cincinnati



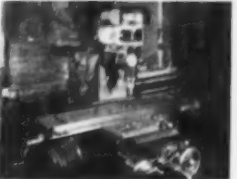
Nichols



Kempsmith



Milwaukee



Bridgeport



EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address: "STRADESO"

**TREE TOOL AND DIE WORKS**  
1600 JUNCTION AVENUE RACINE, WISCONSIN

For more data circle 438 on Reader Service Card



**new shop equipment . . .**

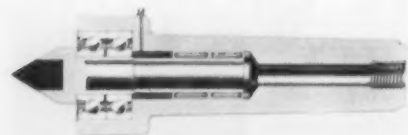


Illustration showing cut-away view of the Cross Carbide-Tipped Live Center

Morse taper shank up to No. 5 and with a straight shank up to 2 inches in diameter.

For more data circle 102 on Reader Service Card

★ ★ ★

## HORIZONTAL GRINDERS FOR GENERAL UTILITY WORK

Two horizontal grinders which are designed for general utility work have been announced by Buckeye Tools Corp., Division 17, P.O. Box 966, Dayton 1, Ohio. Designed for all classes of grinding work from accurate grinding using a tool post holder to heavier work using a 4 or 6-inch organic wheel, the grinders are available in five speeds. Each grinder features a built-in muffler which effectively reduces exhaust noise, yet has no external parts to increase the tool body diameter. Available with either a  $\frac{3}{8}$ -24 or a  $\frac{1}{2}$ -13 spindle, the grinder is designed for fast, easy servicing. Both models can be completely disassembled without using any special tools.

Each grinder is equipped with a "C" Series air motor. Capacities range from

## A SMALL LOT METAL STAMPING SERVICE AT LOWEST POSSIBLE DIE COST

**FIRST...In Experience • In Know-how**

- In Research • In Quality
- In Service



The sketch briefly describes the cost of a typical part made for one of our thousands of customers.

We have a short run stamping service to offer beyond comparison.

### EXAMPLE



MAT'L C.R. STEEL

\$63.20 for first 100 pieces including tools.

\$5.20 for each additional 100 pieces plus material.

Factory trained representatives in all centers. Write for full details.

**DAYTON ROGERS**  
*Manufacturing Company*  
MINNEAPOLIS 7D, MINN.

For more data circle 439 on Reader Service Card





**NEW  
ABRASIVE SCREEN  
MADE WITH AVISCO RAYON  
OUTLASTS ORDINARY  
DISCS 7 TO 15 TIMES**

Working with The Carborundum Company, American Viscose helped develop a revolutionary sand screen to replace conventional abrasive discs. It has a useful life 7 to 15 times greater for two reasons: First, the removed material flows out through the open mesh. Second, it is made from Avisco filament rayon yarn that stays "young and muscular" even when loaded with phenolic resins and abrasives. The result is an abrasive far more useful to you.

American Viscose Corp.,  
350 Fifth Avenue, New York 1, N.Y.



America's Greatest Industries Grow with **AVISCO®**

For more data circle 440 on Reader Service Card



**new shop equipment . . .**



**Buckeye General-Utility Horizontal Grinder**

2 1/2 x 1/2-inch organic wheel to 4 x 1/2-inch vitreous wheel on the 3/8-24 spindle model and from 2 1/2 x 1-inch to 6 x

1/2-inch organic wheel on the 1/2-13 spindle model. Either type of grinder can be adapted to use with wire brushes or roll abrasives.

For more data circle 103 on Reader Service Card

★ ★ ★

**TAP HOLDER PROVIDES  
ACCURATE, TROUBLE-FREE  
PERFORMANCE**

Scully-Jones and Co., 1909 S. Rockwell St., Chicago 8, Ill., has announced

a heavy-duty tap holder which provides accurate and trouble-free performance in heavy-duty tapping and similar operations. For use in radial drills, drill presses, lathes, boring mills, milling machines and tapping machines, the tap holder has been designed primarily for driving large hand and pipe taps. A new style snap ring grips the shank of the tap, holding it securely in place in a central position. There are no set screws to tighten or to work loose and create safety hazards. The snap ring makes it easy to insert and remove taps, yet the tap will not pull out under normal operating conditions. The square on the tap shank



The Walker Vacuum Chuck is proving an important essential in the development of the far-reaching jet engine program. Non-magnetic materials are held effectively for machining at a marked saving of time and effort. Uniform quality and increased production are assured by actual performance.

**O. S. WALKER CO. Inc.**

WORCESTER 6, MASSACHUSETTS

*Original Designers and Builders of Magnetic Chucks*

For more data circle 441 on Reader Service Card



# know-how

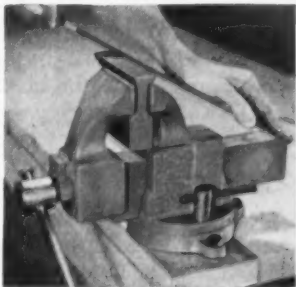
## to dress grinding wheels for greater production

Desmond dressers lengthen life, increase production of all types of grinding wheels. Desmond Dresser Guide wall chart tells which model is best suited for each wheel. Send in coupon below.



## to use Desmond vises for better work

Desmond-Simplex vises, built with steel slide, 360° swivel, replaceable jaw inserts, non-pinch handle, and other extra features, supply the "third hand" in factory, garage, machine shop, or home or farm shop. Thirteen models—including machinists', sheet metal, hinged pipe, drill press and milling machine, and woodworkers'.



THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

# Desmond

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

For more data circle 442 on Reader Service Card



**new shop equipment . . .**

is said to fit securely in the broached square of the holder to provide a positive drive which eliminates slipping and possible tool damage.

According to the manufacturer, accurate tapping demands precise centering action, and this is provided on the tap holder by the improved design com-



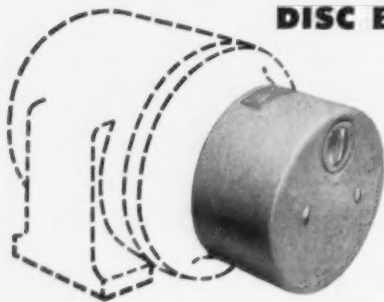
**Scully-Jones Heavy-Duty Tap Holder**

bined with the snap ring. Concentricity between the holder shank and bore is said to be within 0.002 inch gaged at a distance equal to the projection of a standard tap from the holder, assuring

a true-running tool which helps eliminate bell mouth and over-size tapped holes.

The heavy-duty tap holder is manufactured from stress-proof steel which possesses sufficient yield strength for tough tapping operations. The tang is induction-hardened to resist burring and abuse, and the thick body wall will take the punishment encountered in heavy-duty tapping operations. The body of the holder should not be piloted in guide bushings. The holder can be used for driving tools to be dropped through the work and for tools which do not form a functional part of the holder. In addition to driving taps, it

**NOW! *new* STEARNS MAGNETIC  
DISC BRAKES**



*designed  
for new  
motor  
sizes*

Quick-stop, instant-release Stearns magnetic brakes — choice of leading motor manufacturers — are now built to fit *rerated NEMA motor frames in the 1/20 hp to 100 hp size range.*

- ✓ **Mounts on these Frames** — 42-C, 48-C, 56-C, 66-C, 182, 184, 213-286, and Stearns-type mountings. Floor mounting also available.
- ✓ **Torque Range** — 6 lb in. to 7,500 lb ft.
- ✓ **New Shorter Size** — fits into tight quarters.
- ✓ **Easy Single Nut Torque Adjustment.**
- ✓ **Simple Installation and Maintenance.**

1111

**NEW INFORMATIVE BULLETIN**

Complete details in Brake Portfolio 604-F-4. Write today.

**MAGNETIC EQUIPMENT FOR ALL INDUSTRY**

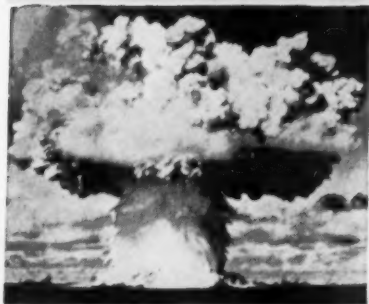
**STEARNS  MAGNETS**

STEARNS MAGNETIC, INC., 664 S. 28th St., Milwaukee 46, Wis.

For more data circle 443 on Reader Service Card



Checked for accuracy by **ATOMIC LIGHT**



## JOHANSSON GAGING EQUIPMENT



**Assures You Precision to the Finest Degree, to Meet Your Most Exacting Requirements—Backed by the Name Supreme in the World of Measurement.**

*Swedish Johansson Gage Blocks are checked for accuracy by the latest scientific method, the atomic light, utilizing the lightwaves emitted from the Mercury isotope 198, now in use at the standard Bureaus throughout the world.*

### GAGE BLOCKS

(JOHANSSON) and accessories. Short deliveries. Inspection and reconditioning service available at our plant.

### INTERNAL INDICATORS

(for inside measurements .155 to 24 inches). Scale range plus or minus .001 graduated to .0001 and minus .020 graduated to .0001.

### MIKROKATOR

(Amplifier — for outside measurements) Graduations .0001 to .000002 or .001 M to .0002 M.

### OTHER JOHANSSON PRODUCTS

Micrometers, Snap Gages, Extensometers, Dynamometers, Hardness Testers, Surface Finish Indicators, Interferometers, Plugs, Rings and Special Gages.

*Write for Literature*

## C. E. JOHANSSON GAGE CO.

A DIVISION OF SWEDISH GAGE CO.  
10641 HAGGERTY AVE. • BOX 4086 NORTHEASTERN STATION • DEARBORN 1, MICH.

For more data circle 444 on Reader Service Card

December, 1955

modern machine shop 249



**new shop equipment . . .**

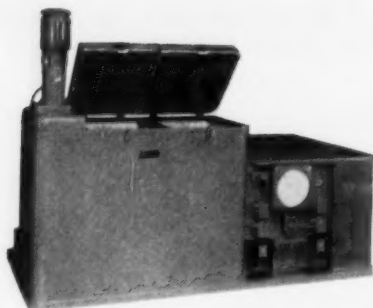
provides a rugged, square drive for reamers, staybolt setters, flue expanders and other similar tools.

For more data circle 104 on Reader Service Card

★ ★ ★

**LOW-TEMPERATURE CHILLING UNIT HAS LARGE THERMAL CAPACITY**

Designated as the Model 3SR-120-16, a low-temperature chilling unit with an unusually large thermal capacity has been developed by Cincinnati Sub-Zero Products, 3930-S5 Reading Rd., Cincinnati 29, Ohio. Designed especially for quenching procedures in the heat treating of perishable tools, the machine is also suitable for many other types of low temperature work. The

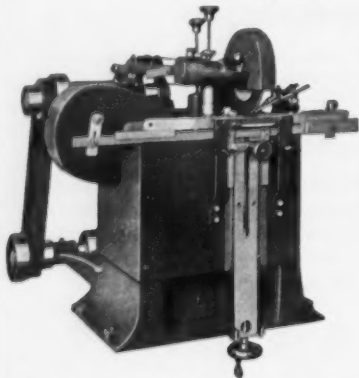


**Sub-Zero Model 3SR-120-16 Chilling Unit**

unit is said to be capable of chilling 250 pounds of tool steel from plus 80 deg. F. to minus 120 deg. F. per hour. The chilling chamber is 48 inches long x 18 inches wide x 33 inches deep and is made of electric-welded pressure-tight galvanized steel. Total chamber capacity is 16 cubic feet or 110 gallons.

# **PAYS for ITSELF**

**By Getting up to Six Times More Service  
from your Hack Saw Blades**



Think of the money Wardwell EC Combination Grinder will save you—increases hack saw life as much as six times.

Wardwell Model EC Combination Grinder is the only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables the operator to grind a variety of blades without dressing or changing wheels.



**Maker of largest line of saw and tool sharpening machines**

For more data circle 445 on Reader Service Card





**YOU'LL LIKE THIS**

*fast, accurate,  
easily handled*

**MILLERS FALLS  
PORTABLE SHEAR**

Its light weight (only 8 lbs.), ease of control and excellent visibility at point of cut permit speed and accuracy on either inside or outside work, straight, curved or irregular lines.

#### **CUTS 16 GAUGE STEEL**

Precision-ground, heat-treated alloy steel blades of this rugged high-production tool will give you smooth clean cuts in steel and galvanized sheet up to 16 gauge (.060"), and up to 50% greater thickness in aluminum, copper and other non-ferrous metals.

Adjustments for depth of cut and clearance are extremely simple to make, and blades are easily removed for sharpening: the two hex keys needed are conveniently located right in the tool handle, which is shaped for most convenient holding in any preferred position.

#### **GET THE DETAILS**

Send now for free literature on the Millers Falls No. 16 Shear, and the complete line of Millers Falls high-performance, advanced-design electric tools. Or we'll be glad to arrange for a demonstration in your own shop on request.



**MILLERS FALLS COMPANY**  
Dept. MM-10 Greenfield, Mass.



*Finest Power Tools Made*

For more data circle 446 on Reader Service Card

December, 1955

modern machine shop 251



**new shop equipment . . .**

The machine is used in heat treating of alloy steels where low temperature quenching is required to achieve transformation of austenite to martensite. This low temperature is also used for normalizing and stress relieving of non-ferrous castings, and chilling for expansion-fit assembly. When used for treating small tool bits and similarly

sized pieces, the parts are placed in the chilling chamber in baskets. An agitator is used to provide mechanical agitation of the convection fluid in the chamber for uniform rapid cooling of the tool bits. A specially-designed draft tube and fillet on the agitator provide for controlled flow of the convection fluid. A drain in the bottom of the chamber, leading to a valve outside the unit, permits draining of the convection fluid. The machine can be used with or without convection fluid, as de-

sired. When used without convection fluid, an air circulator is mounted in one of the lids. The unit is then equipped with inlet and outlet ducts entering directly into the chilling chamber. The flow of air speeds chilling and prevents stratification of the air.

The chilling unit is equipped with two counter-balanced lids which remain in any position. Instrumentation and controls include a temperature controller with a range from minus 70 to minus 150 deg. F.; a recording thermometer with a range from 0 to minus 150 deg. F.; and a 12-inch 24-hour chart. Two 5-hp. ball bearing motors power the re-

# Rotary Broaches Produce PERFECT HOLES

ROTARY BROACHES PRODUCE ROTARY BROACHES PRODUCE

PERFECT-HOLES • PERFECTHO

ROTARY BROACHES PRODUCE ROTARY BROACHES PRODUCE

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PERFECT-HOLE PERFECT-HOLES

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PERFECT-HOLES PERFECT-HOLES PERFECT-HOLES

• A NEW INVENTION!

• A NEW MACHINING METHOD!  
ROTARY BROACHING\*

• A NEW NAME - "ROTARY BROACH"

ROTARY BROACHES may be used in lathes, turret lathes, automatics, drill presses, etc. to

**PERFECT-HOLES • PER** replace reamers. They produce perfect holes with finishes that can only be compared to

ROTARY BROACHES PRODUCE ROTARY BRO

PERFECT-HOLES PERFEC

PERFECT HOLES • PERFECT

- A NEW INVENTION!
- A NEW MACHINING METHOD!  
ROTARY BROACHING\*
- A NEW NAME - "ROTARY BROACH"\*

**ROTARY BROACHES** may be used in lathes, turret lathes, automatics, drill presses, etc., to replace reamers. They produce perfect holes with finishes that can only be compared to honing. They last longer before grinding is necessary and may be resharpened 10 to 30 times. They produce perfect holes at a fraction of the cost of those produced by other methods. Eliminates grinding, lapping, honing and boring.

**USE THIS NEW MACHINING METHOD—ROTARY BROACHING\***

\* "Rotary Boreach" & "Rotary Boreaching" are new names coined & copyrighted by Shearcut Tool Co.

Patented in Canada, U.S. and Foreign Patents Pending © 1947

**SHEARCUT TOOL COMPANY**

7045 DARBY AVE., Dept. C RESEDA, CALIFORNIA

For more data circle 447 on Reader Service Card





THE  
WORLD'S  
MOST  
VERSATILE  
TAPPING  
ATTACHMENTS

## TAP WITH TAPMATIC

on your . . .

- ENGINE LATHES
- TURRET LATHES
- RADIAL DRILLS

COMPLETE  
RANGE OF  
SIZES  
FROM  
#0 — 2"

ELIMINATE HUMAN AND MECHANICAL LEAD ERRORS. OBTAIN  
CONSISTENTLY UNIFORM THREADS AT LESS COST. REDUCE  
EXCESSIVE TAP WEAR AND TAP BREAKAGE. TWO COMPLETE LINES  
FOR EITHER REVERSIBLE OR NON-REVERSIBLE SPINDLES.

LITERATURE UPON REQUEST.

# TAPMATIC

CORPORATION

845 West 16th Street • Costa Mesa, California • Phone Liberty 8-3404

For more data circle 448 on Reader Service Card



# 4 Reasons why you should use **GAMMONS DIE REAMERS**



Specially treated for today's modern die steels.



Rapid cutting capacity.



Tapers per inch .005, —.008, —.013 in stock.



Large range of standard sizes in stock at all times for your convenience.

WRITE FOR  
COMPLETE INFORMATION

**GAMMONS • HOAGLUND CO.**

MANCHESTER 2,

CONN.

Manufacturers of helical taper pins, chucking,  
die makers and special reamers.

**new shop equipment . . .**

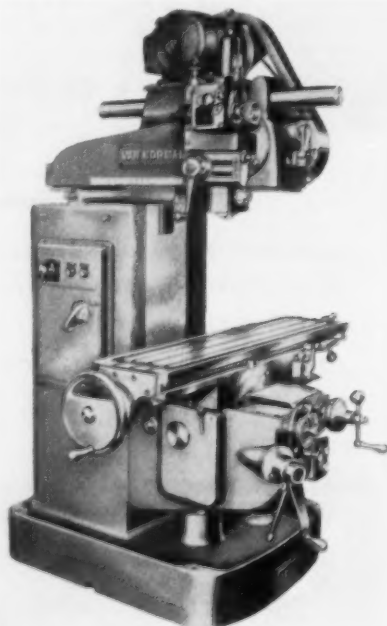
frigeration system. Construction is of heavy gauge steel. Overall dimensions, exclusive of the externally-mounted agitator, are 96 inches long x 50 inches wide x 45 inches high.

For more data circle 105 on Reader Service Card

★ ★ ★

## **RAM-TYPE MILLER FEATURES QUILL ADJUSTABLE CUTTER HEAD**

Van Norman Co., Springfield, Mass., has announced the No. 16S Ram-Type Milling Machine with a quill adjustable cutter head which permits horizontal, angular and vertical milling, plus boring and drilling, on one ma-



Van Norman No. 16S Ram-Type Miller

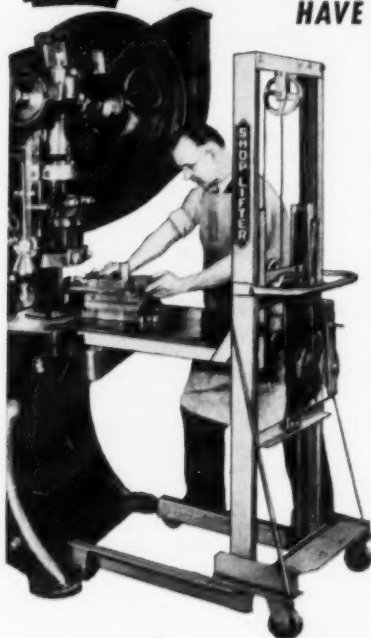
For more data circle 449 on Reader Service Card



# 2 *Economy* LIFTERS

**EVERY TOOL AND DIE ROOM SHOULD  
HAVE FOR FAST, SAFE, HANDLING OF DIES**

## SHOPLIFTER



Use the SHOPLIFTER to avoid risk of painful accidents and to protect costly dies. Transport dies from storage area to press. To move dies in and out of press. Use it as an adjustable height bench for working on dies.

Platform lift 4'6", high enough for all press beds, yet overall height will clear any standard doorway.

Width 24". Moves easily between machines—in confined areas.

Spur gear hoist unit—most efficient hoist mechanism—lifts capacity load with only 20# crank pressure.

Friction disc clutch holds load securely—automatically.

Big safety factor for occasional overloading when necessary.

### Three capacities to choose from

Type D (illustrated) 500 lbs. capacity.....	\$183.60
Type DX—1000 lbs. capacity.....	350.00
Type DX—2000 lbs. capacity.....	420.00

## ELEVATING TABLE

**A husky Elevating Die Table, with big overload safety factor. Use as work bench at each machine.**

Dimension 24"x36". Use it for small, medium and large dies. Capacity 2,000 lbs.



### GREATER LIFTING RANGE

24" minimum to 42" maximum height. Wheels under base-frame—you can get up tight against press or rack.

Four crank studs—two at each end of table for high and low speed adjustment.

Roller bearings in wheels and casters for easy moving.

Floor lock holds table securely when moving DIES on and off.

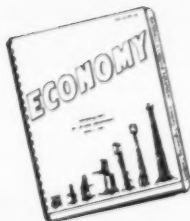
Price \$215.00 F.O.B. Chicago.

*Available from your local supplier*

**ECONOMY ENGINEERING CO., 4507 W. Lake St., Chicago 24, Illinois**

Eastern sales office, 342 Madison Ave., New York 17, N.Y.

For more data circle 450 on Reader Service Card



**Write for New Economy Catalog 55** describing all Economy standard products, special engineered overhead service lifters, and material handling machines.



## new shop equipment . . .

chine without attachments. According to the manufacturer, the machine is designed to provide maximum rigidity, cutability and accuracy and to increase production and reduce costs in the toolroom, machine shop, pattern shop

### CAMS

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.

23-16 44th Road Long Island City 1, N. Y.

For more data circle 451 on Reader Service Card

**Micro Supreme**  
**LAY-OUT AND IDENTIFICATION DYE**  
**7 COLORS**

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

**MICHIGAN CHROME & CHEMICAL COMPANY**  
8615 Grinnell Ave. • Detroit 13, Mich.

For more data circle 452 on Reader Service Card

and on the production line. The quill adjustable cutter head has a 4-inch quill travel; three quill power feeds of 0.005, 0.003 and 0.006 inch; and eight spindle speeds ranging from 110 to 3,600 r.p.m. The cutter head spindle utilizes a 2-h.p. motor. Other features of the machine include a 40½ x 10-inch table, power table travel of 22 inches, hand cross feed of 10 inches, hand vertical feed of 22 inches and ram movement in and out over the column of 20½ inches.

For more data circle 106 on Reader Service Card

★ ★ ★

## ALUMINUM OXIDE RESINOID CUT-OFF WHEELS

Bonded Abrasives Division of The Carborundum Co., Niagara Falls, N. Y., has announced the B7 bond line of "Aloxite" Aluminum Oxide Resinoid Cut-Off Wheels which are designed to combine all of the desirable qualities essential to dry production metal cut-off operations. According to the manufacturer, the wheels produce a fast, cool cut because of the characteristics of the new B7 bond. A special process in the manufacture is claimed to produce sharp sides on all wheels to prevent binding in the cut. The high bond strength combines with the freedom of cut to produce trouble-free operation.

Simplified grading for customer convenience is a feature offered in the new

**CUT TOOL COSTS**

broken tools made like new again with **NU-TANGS**

Twisted or broken tangs replaced at low costs on any tool with a Morse Taper (sizes 1 to 6). Hundreds of leading industries save money on drills, reamers, countersinks, cutters, drivers, the NU-TANG way. Prompt delivery. Send for prices—or send tools for repair. All work guaranteed.

**NO WELDING! NO SLEEVES! NO SHORTENING! NO DISTORTION! GUARANTEED STRONG AS NEW!**

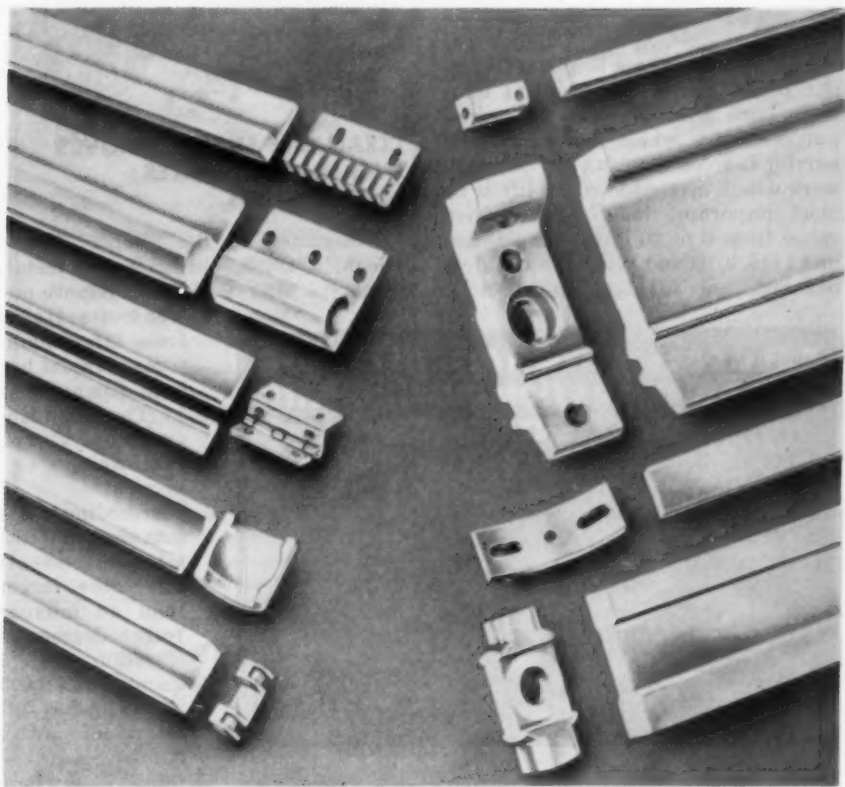
Send them to us like this! We return them like this!

Without Pay 2,512,011 **NU-TANGS INC.** 1339 Bates Avenue Cincinnati 25, Ohio

For more data circle 453 on Reader Service Card



## A SHORT CUT TO A FINISHED PRODUCT



## REDUCE YOUR MACHINING OPERATIONS, REDUCE SCRAP

get a superior wrought metal product with Anaconda extruded shapes

**Cost-saving possibilities unlimited:** In few areas can imagination and ingenuity pay off so handsomely as when applied to the use of extruded shapes. Visualize your finished parts as cross-sectional pieces cut from a long extruded shape.

**Costs come down, quality goes up:** Extruded metal is wrought metal—tough, dense-grained, smooth-surfaced, and easy to machine. When you switch from cast parts, you eliminate rejects due to pits and porosity; you reduce machining, scrap... and finishing time.

A manufacturer of hosiery knitting

machines, for example, found he saved from 25-30% over cast brass. He makes 420 components from 12 different ANACONDA Extruded and Drawn Brass Shapes. He also gets the superior precision, balance, and long-wearing and bearing qualities in these parts, which must operate at high speeds.

**Metals:** Extruded shapes are available in copper, brass, bronze, and special copper alloys—in long full lengths suitable for feeding into turret lathes or automatic screw machines.

**Our experience at your service:** The American Brass Company pioneered in

extruded shapes. The accumulated experience of the organization, its wide selection of dies, may help you short-cut production and save money.

We'll be glad to make suggestions based on your sketch or sample. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

**ANACONDA®**  
EXTRUDED SHAPES

For more data circle 454 on Reader Service Card



### **new shop equipment . . .**

line. Three grades are available; namely, "R" for operations requiring minimum burn and burr, "T" for general purpose work where some burn and burring is acceptable and "V" for rough work where maximum wheel life is the most important factor. Wheel sizes range from 6 to 20 inches in diameter and 1/16, 3/32 and 1/8 inch thick. Metal bushings are supplied on all arbor

holes in the range of 5/8 to 1 3/8 inches. All wheels are available in from 24 to 120 grit.

For more data circle 107 on Reader Service Card

★ ★ ★

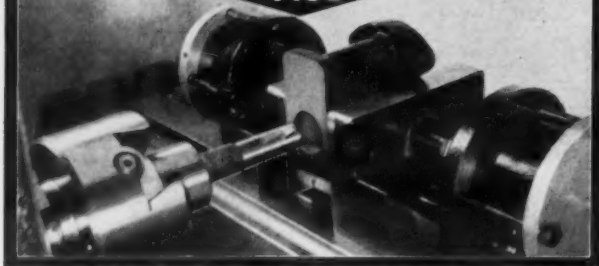
### **CLEANABLE FILTER REMOVES MICRONIC PARTICLES FROM LIQUIDS**

Designated as the "Super" Auto-Klean, a small, cleanable, all metal, edge-type filter designed to remove mi-

cronic particles from large quantities of liquid has been announced by The Cuno Engineering Corp., Meriden, Connecticut.

According to the manufacturer, the filter stops all particles larger than 40 microns (other degrees of filtration are 75 microns and 0.005 inch) which is sufficient for many systems, or in those cases where finer replaceable cartridge-type elements are used as

### **RELOCATE AUTOMATICALLY FOR SECOND OPERATION-BORING WITH BLACK "CENTR-FINDER" VISE**



Relocating for second operation-boring is fast and accurate with a Black "Centr-finder" vise. Locates centers and other pre-determined points within .001" vertically and horizontally, regardless of shape or size of parts. A versatile tool—for drilling, reaming, chamfering and many other operations.



Working range is 0 to 4". Clamping pressures up to 2000 pounds. Force exerted is all straight line. Vise jaws travel on guides—actuated by opposed double-acting cylinders . . . synchronized by mechanical means. No pressure exerted through synchronizing mechanism.

Get all the facts—write for bulletin.

### **THE BLACK DRILL COMPANY, INC.**

1372 East 222nd Street • Cleveland 17, Ohio

For more data circle 455 on Reader Service Card



Cuno "Super" Auto-Klean Micronic Filter





## COOLANT MIST GENERATORS

**H**ERE'S the simplest of all mist generators. Splendid results are obtained in all milling, drilling, sawing, tapping, turning or grinding operations. Ideal for lubricating punch press dies; also for applying parting agent to plastic and metal die casting molds.

Needs no special coolant. Produces finer finishes. Increases tool life. Increases production. Systems available for as low as \$30.

Write for circular 1255

**AETNA MFG. CO.**

192 S. YORK ST.,

BENSENVILLE, ILL.

For more data circle 456 on Reader Service Card



## CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING  
& MFG. CO.**

WRITE FOR CATALOG

1114 E. 87TH ST.

CHICAGO 19

For more data circle 457 on Reader Service Card

December, 1955

**Quick Sure Grip**  
for any work  
ON ANY MACHINE TABLE



**HART**  
DIVIDED  
MACHINE VISE  
JAWS

To hold large or small work securely for any machining—planing, grinding, milling, drilling, etc.

Used singly or in pairs, they are simply bolted or clamped to the machine table. The hardened tool steel jaws are angled to hold down the work, and their edges are serrated to insure a firm grip. The HART Machine Vise is 10 1/4" long, 5" wide, and 2 1/2" high. The jaw itself is 3" by 6". Price \$20.00 each, f.o.b., Cambridge, Mass.

Write for circular

**WALTER W. FIELD & SON, INC.**

39 Hayward St., Cambridge 42, Mass.

Makers of the famous  
**HART MILLING FIXTURES**  
"Masters of a Thousand Set-ups"

For more data circle 458 on Reader Service Card

modern machine shop 259



## new shop equipment . . .

secondary filters, cartridge life is extended. This is because the filter prevents premature plugging of filtering surfaces in the secondary cartridge by removing all oversized particles and agglomerated contaminants.

Because of the unusually low press-

## SAVAGE NIBBLING MACHINES



**SPECIAL**  
**TOOLS AND DIES FOR**  
**SAVAGE NIBBLING MACHINES**  
SAVAGE TYPE "S" Tools and Dies are made from a high carbon, high cobalt, special high speed steel. The life of the tool is increased many times, which means less sharpening, less down time and increased production. **PATENTED SAVAGE** Tool holder permits adjustment of tool for length, which makes possible repeated sharpening.  
Quotation on Request  
**"NIBBLE YOUR COSTS"**

**W. J. SAVAGE COMPANY**  
Knoxville Since 1885 Tennessee

**PIONEER MFRS. OF NIBBLING MACHINES**  
For more data circle 459 on Reader Service Card

ure drop across the "Super" Auto-Klean, flows can be handled in a small space. For example, a single 40 micron filter measuring only 15 inches high x 6 inches in diameter will handle 30 g.p.m. of 200 SSU oil with only a 3 p.s.i. pressure drop. With a slightly higher pressure drop, 75 per cent more flow can be handled. The design features of small size, high flow rates and low pressure drop are combined with cleanliness. Cleaning is done without stopping flow, simply by turning the handle by either hand or motor drive. Accumulated sludge may be drained off at convenient periods through the bottom drain plug.

For more data circle 108 on Reader Service Card

★ ★ ★

## RADIUS TURNING ATTACHMENT ALLOWS RADIUS TO BE PRESET

The Wade Tool Co., Waltham, Mass., has announced a radius turning attachment which is designed to allow the radius to be preset to a finished diameter. Having a capacity of from 0 to 4 inches, the attachment is actuated by a worm and worm gear to provide maximum control in generating spherical surfaces. Although designed primarily to be used on the Wade line of lathes, the radius turning attachment can be used on other makes of lathes with an adapter plate. Two toolholders are supplied as standard equipment. One of

## A MATCHED SET OF TRANSFER PUNCHES for toolmakers, machinists & tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Single Sizes Available

.0025 undersize to facilitate use. Precision made of finest tool steel. Carefully heat treated and tempered for long life. SET No. 3-17—28 punches with indexed stand—Sizes 3/32" to 1/2" by 1/64" plus 17/32" size—length 4-7/8".

PRICE, only \$16.80

**R. L. SPELLMAN CO. • URBANA, OHIO**

For more data circle 460 on Reader Service Card



## Complete Bench Needs!



Here's the answer to your production and storage problems — a laminated maple top bench, 60" x 24" x 31 1/4" high, with a steel cabinet base, 36" x 21" x 31 1/2" high.

Locker Benches  
Cabinet Benches  
Leg Benches  
Complete  
Shop Equipment

Send for literature **TODAY!**

**PARENT METAL PRODUCTS INC.**

234 S. Fourth St.,

Philadelphia 6, Pa.

For more data circle 461 on Reader Service Card



**MADE TO  
BLUE PRINT**

Dowel — Straight  
Countersunk — Taper  
± .0001" Accuracy  
.030" to .125" Diam.  
Up to 2" Length

Precision Centerless Grinding Since 1931  
Inquiry Invited on Your Volume Requirements

**COMMERCIAL  
CENTERLESS  
GRINDING CO.**

6605 CEDAR AVE. Phone EN 1-3412 CLEVELAND 3, O.

For more data circle 462 on Reader Service Card

December, 1955



## Plant lighting differs

... to maintain machine  
capacity install

**VIMCO** *Lights*



Vimcolights put non-glare light right on the work area . . . removing shadows caused by normal plant lighting. Slow downs, rejects and accidents are fewer. Production is better.

Six standard models.  
Special models for  
OEM use.

Write today.



Vimcolights are

**UL** LISTED

**VIMCO MFG. CO., Inc.**

Since 1919

111 BRAYTON STREET • BUFFALO 13, N. Y.

For more data circle 463 on Reader Service Card

modern machine shop 261



**HIGHER SPEEDS!  
FASTER GRINDING!**

**kipp**

## AIR GRINDERS

MODEL JA  
50,000 R.P.M.

**\$42<sup>00</sup>**

IN U.S.A.



Weight 12 ounces;  
length 6 3/4 inches;  
chuck size 1/4 inch.  
Wheel guard removed  
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

**kipp**

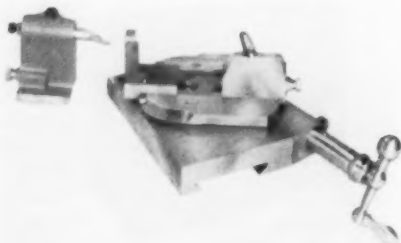
### MADISON-KIPP CORP.

208 Waubesa St., Madison 10, Wis., U. S. A.

For more data circle 464 on Reader Service Card

262 modern machine shop

**new shop equipment . . .**



*Wade Tool Radius Turning Attachment*

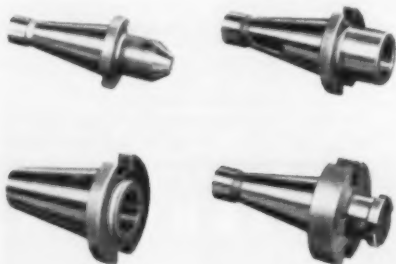
the toolholders is required to turn annular grooves or collars, because its shape avoids interference with the bar. The other toolholder is used for turning spherical surfaces on the end of the bar.

For more data circle 109 on Reader Service Card

★ ★ ★

### TOOLHOLDERS

Universal Engineering Co., Frankenth, Mich., has announced new additions to its line of toolholders. The new additions include single and double end mill adapters, tang drive tapered socket adapters, drawbar-type tapered socket adapters and shell end mill arbors. The holders are precision made from care-



*Universal Engineering Toolholders*

December, 1955





## TRUE POINT DRILL SHARPENER

for Drills 41 - 60 and  
61 - 80 R.H. & L.H.

A properly sharpened drill cuts  
faster — more accurately and is  
less likely to break.

Write for circular and  
full details.

UP-TO-DATE TOOL CO.

P. O. Box 99, Station A, Worcester 8, Mass.

For more data circle 465 on Reader Service Card

TAKE  
THE

**KING PORTABLE**

ANYWHERE

TO MAKE ACCURATE  
BRINELL TESTS

Accuracy Guaranteed To  
Well Within ASTM Requirements

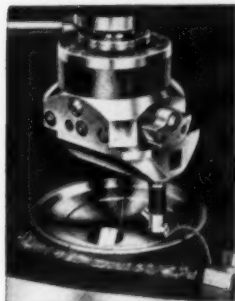
- Puts 3000 kg load on a 10mm ball
- Can be used in any position—even upside down
- Has a removable test head for testing very large parts
- Weight: only 26 lb.
- Popular because it is practical ... and accurate



**KING TESTER CORP.**  
442 N. 13th St., Phila. 23, Pa.



For more data circle 466 on Reader Service Card



## REASONS WHY MODERN ENGINEERS SELECT The Wohlhaupter **MASTERHEAD**

For Precision Work & Most Economical & Automatic Operation

- The MASTERHEAD does Boring, Facing, Recessing, Undercutting, Outside Turning, etc.
- It does this in One Operation and on One Machine.
- Automatic Feeds
- Automatic End Release.
- Increases the capacity of your present equipment.
- Increases Production, makes Better Finished Work.
- Nine Models available for work up to 36 1/4" diameter.

Also tape cutting heads.

Sole Agent

Send for illustrated literature.

**KARL A. NEISE**, 404 Fourth Ave., Dept. MMS, New York 16, N. Y.

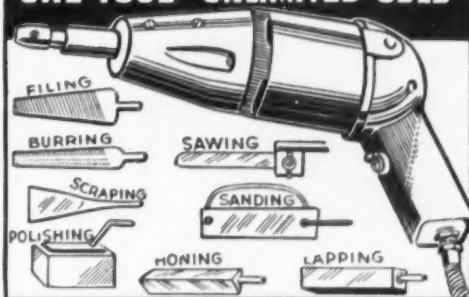
For more data circle 467 on Reader Service Card

# CUT PRODUCTION TIME!

Use these Handy PORTABLE  
ELECTRIC RECIPROCATING  
TOOLS for Greater Production,  
Better, More Uniform Work—  
All with less Operator Fatigue.  
Fixed strokes are 1/8" or 3/8"  
long. Operate on 110 Volts  
AC-DC. Deliver 1000 PUSH-  
PULL strokes per minute. Try one  
of these tools on your next job.

Send for Descriptive Literature.

## ONE TOOL - UNLIMITED USES



## ACME TOOL COMPANY

73 WEST BROADWAY

NEW YORK 7, N. Y.

For more data circle 468 on Reader Service Card



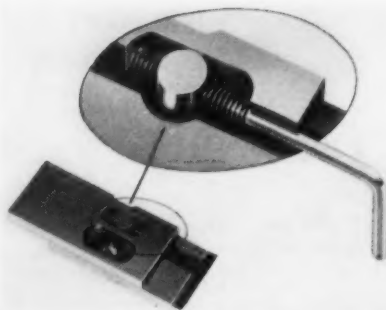
**new shop equipment . . .**

fully selected steels. According to the manufacturer, work can be held to close tolerances with the holders.  
For more data circle 110 on Reader Service Card

★ ★ ★

**BORING AND REAMING CUTTERS HAVE FULLY PROTECTED ADJUSTMENT**

Maxwell Co., 325 Broadway, Bedford, Ohio, has announced fully protected cutter adjustment on its boring and reaming cutters, making possible substantially improved cutter performance and increased tool life. The micrometer adjusting screw is fully protected against wear and gall from chips and permits positive adjustment in both directions to increase or decrease cutter diameter. The design is said to



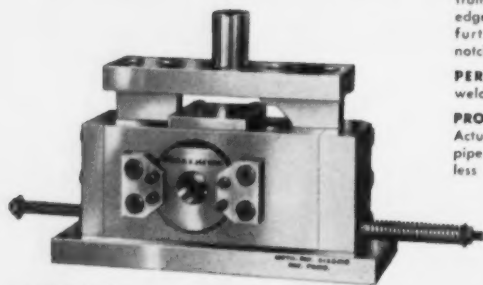
*Fully protected cutter adjustment on Maxwell Boring and Reaming Cutters*

permit chip clearance to remain constant throughout the life of the cutter. The tools also feature selective float control for reaming operations. The cutter floats in the bar at the point of cutting action, and the float may be adjusted between the bar and the cutter to compensate for misalignment of

★ ★ ★ ★ ★



**THESE ENDS WITH ONE STROKE OF PUNCH PRESS**  
**ARC-FIT TWIN NOTCH**



PATENT PENDING

**NO DEFORMATION** Shears from inside out—cuts clean edges; eliminates need for further finishing; aligns notches automatically.

**PERFECT "T" Joints** for welding or brazing.

**PRODUCTION NOTCHING** Actual production time per pipe or tube end reduced to less than 3 seconds.

**INTERCHANGEABLE** Punches and dies up to 2½" O.D. pipe or tube for STANDARD TWIN NOTCH. (Special units available up to 3" O.D.)



SEND FOR  
DESCRIPTIVE  
LITERATURE

**VOGEL TOOL AND DIE CORPORATION**

1823 N. 32nd Ave. Melrose Park, Illinois  
Fillmore 5-0160

For more data circle 469 on Reader Service Card



Precision Sharpen Your Die-Sinking Cutters on an

**ALEXANDER**  
Bench Grinder!



Over 1,000 sold in United States.

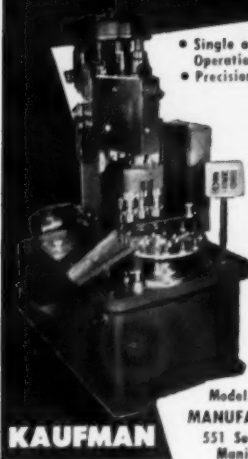
Write to Dept C for catalog.

**J. ARTHUR DEAKIN & SON**  
150-28 Hillside Ave., Jamaica 32, N. Y.

For more data circle 470 on Reader Service Card

## KAUFMAN TAPPING MACHINES

BUILT FOR SPECIFIC PRODUCTION JOBS



- Single or Multiple Head Operations
- Precision Depth Control
  - Non-reversing Motor Drives
  - Pressure Lubricated Lead Screws
  - Fast, Accurate Rugged Index
  - Other Head Units Available
  - Other Worthwhile Features.

Catalogs Nos. 754 and 1153  
Mailed on Request.

Model 75-24  
**KAUFMAN MANUFACTURING CO.**  
551 So. 29th Street,  
Manitowish, Wis.

For more data circle 471 on Reader Service Card  
December, 1955

For Arbor Spacers and Shims,  
Feeler Stock or Shim Stock...

**specify top-quality**



### ARBOR SPACERS AND SHIMS

20 arbor sizes  $\frac{1}{16}$ " to 4" ... 19 thicknesses .001" to .125"

Specify with or without keyways. Also available—hardened and ground spacing collars (with standard keyway)  $\frac{1}{4}$ " to 3" long in all popular sizes. (For use in milling, slitting and gang-saw setups, shimming gears and bearings.)

### FEELER STOCK

Made from tempered stock, rolled to close tolerances.  $\frac{1}{2}$ " x 25' coils packaged in transparent plastic boxes, except above .020". Strips  $\frac{1}{8}$ " x 12", in cellophane. 27 thicknesses. All thicknesses from .001" to .032". (For use in precision fitting, checking clearances, inspection and production work.)



### SHIM STOCK

Selected from material rolled to precision limits, free from burrs, and protected by oil coating. Coils packed in carton for easy dispensing and protection. 15 thicknesses .001" to .032". Sheets 6" x 12"; coils 6" x 120". Available also in assortment package of 12 thicknesses .001" to .015".

For details and prices,  
write for descriptive literature.



**Detroit Stamping Co.**

349 MIDLAND AVE. • DETROIT 3, MICH.

For more data circle 472 on Reader Service Card  
modern machine shop 265



## **new shop equipment . . .**

equipment. In boring operations, the cutter is locked in the bar to hold concentricity.

Dull cutters can be changed in seconds without changing the setup, as only the cutter is removed for sharpening. Cutters are simply sharpened and then quickly adjusted to size with the protected micrometer screw. Only 16

cutters are required for bores between 1 and 2 inches in diameter. The cutters are available singly and in sets.

For more data circle 111 on Reader Service Card

★ ★ ★

## **10-TON STANDARD OPEN-BACK INCLINABLE POWER PRESS**

Famco Machine Co., 3122 Sheridan Rd., Kenosha 95, Wis., has announced the addition of a 10-ton standard open-

back inclinable press to its line of power presses. According to the manufacturer, the 10-ton press has incorporated many improved features, including extra long ram ways; increased ram adjustment; greater ram area; precision-fitted ram block to ensure perfect alignment; one-piece heat-treated



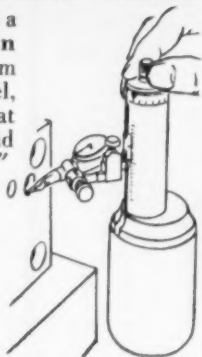
## **with GREIST MICRO-HEIGHT® GAGE**

Precision-built Micro-Height scribes like a vernier height gage, **reads faster than your micrometer!** You read direct from **zero at base to 3"**. Hundredths on barrel, thousandths on large-diameter head that **cuts reading time!** Precision ground and lapped Riser extends range to 9"

### **CUT INSPECTION TIME!**

Add your dial indicator to quickly read distances between holes, surfaces.

Precision-built, satin-chrome finished Micro-Height Gage quickly pays for itself! **Write for circular with prices.**



THE **GREIST** MANUFACTURING CO., 4912 BLAKE ST., NEW HAVEN 15, CONN.

*Precision Products since 1871.*

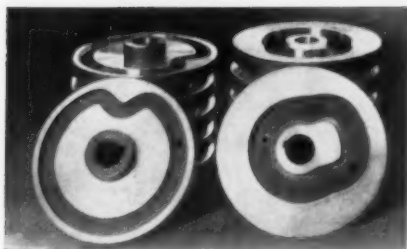
For more data circle 473 on Reader Service Card



**Famco 10-Ton Standard O.B.I. "Electromatic" Power Press**



## Rowbottom for Cams



### Any type...any quantity...promptly

Half a century's specialized experience combined with modern facilities are your assurance that Rowbottom can handle your most exacting requirements. Submit specifications . . . ask for estimates.

**THE ROWBOTTOM MACHINE CO.**  
WATERBURY, CONNECTICUT

Also Cam Milling and Grinding Machines for producing cams of all types. Ask for details.

For more data circle 474 on Reader Service Card

**JACO** LOW COST  
AUTOMATIC

**STOCK REEL**  
COSTS NO MORE THAN  
STANDARD STOCK REELS

POWERED BY  
THE NATURAL  
SPRING OF  
UNCOILING STOCK



3 SIZES — ALL WILL TAKE 6" WIDE STOCK.

24" diameter \$85.00

30" diameter \$89.00

36" diameter \$95.00

Guaranteed — money back if not 100% satisfied

New LOW prices  
on the JACO  
3-inch and 6-inch  
SCRAP CHOPPER



**WRITE FOR FULL  
DETAILS TODAY!**

Dealer Inquiries limited

**JACO DEVICES, INC.**

98 HIGH STREET • HINGHAM, MASS.

For more data circle 475 on Reader Service Card

December, 1955

**LIVE CENTER  
ACTION WITH  
DEAD CENTER  
ACCURACY**

USE



**ANTI-SCORING  
LUBRICANTS**



**PROVE IT TO  
YOURSELF IN  
YOUR OWN PLANT FOR ONE  
DOLLAR AND THIS COUPON!**

Free-running on dead centers—with COMPLETE protection. CMD Lubricants are CONCENTRATED, form a "tough" film—absolutely NO GALLING or SEIZING—under the heaviest load. STABILIZED for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to LIVE CENTER ACTION with DEAD CENTER PRECISION. The bigger the job, the better you'll like it.

**TRIAL ORDER—  
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!

Bill me ☐ Bill my company ☐

Name

Company Name

Address

City  State

Chicago Manufacturing and Distributing Co.  
1910 West 46th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING  
AND DISTRIBUTING CO.**

For more data circle 476 on Reader Service Card

modern machine shop 267



## new shop equipment . . .

crankshaft; extra heavy, semi-steel, close-grained cast frame; full halved bronze bearings at main bearing; and flywheel which rotates on Timken roller bearings.

The 10-ton standard press has a 1 1/4-

inch stroke, and a 3-inch maximum stroke is available as extra. The press operates at 190 strokes per minute and utilizes a 3/4-h.p., 1,200-r.p.m. motor. Two clutch types are available; namely, the exclusive Famco "Electromatic" nine-point jaw clutch and the "Multi-Power" clutch.

For more data circle 112 on Reader Service Card

★ ★ ★

## DROP FORGED RIVET SETS AND HAND GROOVERS

Drop forged rivet sets and hand groovers are two items recently added to the line of metalworking tools produced by The Billings & Spencer Co., Laurel St., Hartford, Conn. The new items, of particular importance to tin-smiths and sheetmetal workers, are made of specially selected steels and carefully heat treated to provide maximum resistance to the punishing blows to which this type of tool is subjected. Rivet sets are available in 10 different sizes ranging from No. 00 through No. 8 and are said to conform to U. S. Government specifications. Rivet header cup and necessary holes are carefully machined to the correct size and depth.

The hand groovers are produced in Nos. 0, 2 and 4 sizes with accurately machined grooving channels on the working face. The striking face is claimed to be specially heat treated to resist striking blows. Both the hand



**NEW NESTING TYPE  
TOTE PANS**

Sturdy 16 ga. metal.  
20" long x 12" wide  
x 6 1/4" deep. Drag  
holes and handles at  
both ends.

**J. L. LUCAS & SON, INC.**  
Bridgeport 5, Conn.

For more data circle 477 on Reader Service Card



**Coming  
March 19-23**

The best and latest in tools, machines, inspection equipment, automation devices, controls and accessories to cut costs and boost profits—many never before shown anywhere.

- For the small plant
- For the intermediate plant
- For the big plant

**1956 ASTE  
INDUSTRIAL  
EXPOSITION**

INTERNATIONAL AMPHITHEATRE  
**CHICAGO, ILL.**

**AMERICAN SOCIETY OF  
TOOL ENGINEERS**

10700 Puritan      Detroit 38, Michigan

For more data circle 478 on Reader Service Card

**CAMS**

**MADE TO YOUR SPECIFICATIONS**

— Except Screw Machine Cams —

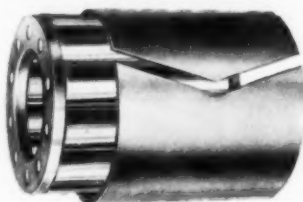
Design Assistance Offered

**KIDDE PRECISION TOOL CORP.**

15 LOCUST AVENUE,      ROSELAND, N. J.

For more data circle 479 on Reader Service Card





TYPE GC

## INDUSTRIAL ROLLER BEARING

STANDARD SIZES ARE SHOWN IN OUR  
GENERAL CATALOG SENT UPON REQUEST.  
SPECIAL SIZES TO ORDER.

ANY QUANTITY, "ONE BEARING OR MANY"

### THE G.WILLIAM COMPANY

Incorporated 1912

358 FURMAN ST.

BROOKLYN 1, N. Y.

For more data circle 400 on Reader Service Card

## CUTTING STOCK DIAMETERS UP TO 40 INCHES?

USE

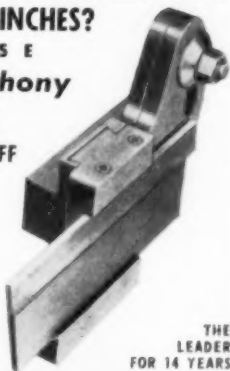
### Skee-Anthony

(PATENTED)

#### CUTTING OFF TOOLS

for . . .

- ★ BORING MILLS
- ★ LATHES
- ★ PLANERS
- ★ SHAPERS



THE  
LEADER  
FOR 14 YEARS

Patented Pivoting Trunnion, Safety-Slip and Support Blade prevent blade breakage and injury to operator. Fast adjustment to lathe center.

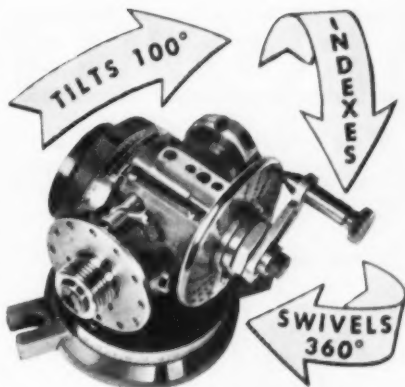
Write for free descriptive folder A-1

**-SKEE TOOL COMPANY**  
1406 N. FLORES ST.  
SAN ANTONIO, TEXAS

• Few Industrial Areas Open for Representatives •

For more data circle 481 on Reader Service Card

December, 1955



FOR FASTER PRODUCTION

## THE ELLIS DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really rugged tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has  $6\frac{1}{2}$ " swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

**IN**  
NICHOLS MORRIS  
**M**  
CORPORATION

76-H MAMARONECK AVE.  
WHITE PLAINS, N. Y.

For more data circle 482 on Reader Service Card  
modern machine shop 269



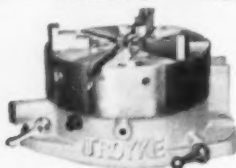
# TROYKE

## ROTO-INDEXER

Takes the place of expensive jigs and fixtures in connection with milling, drilling, jig boring, grinding and slotting.

### INDEXING

**Rapid — Positive — Accurate**



### CHUCK OR T-SLOTTED INDEXING TABLES FOUR MODELS

Hand operated. Unique patented block out arrangement. Can be used in vertical or horizontal position.

## ROTARY TABLES



### STANDARD MODELS WORM WHEEL OPERATED ROTARY TABLES

Five sizes: 9", 12", 15", 21". For die sinking, jig boring, cam milling. Indispensable in wood and metal pattern shops.



### HEAVY DUTY MODELS WORM WHEEL OPERATED ROTARY TABLES

Three sizes: 18", 21", 25". These larger, heavy duty models are used for jig work, planer jobs, and on horizontal boring mills. DIVIDING ATTACHMENTS or DRILLING ATTACHMENTS can be furnished. SEE YOUR DEALER OR

WRITE FOR CATALOGS.



**TROYKE MFG. CO.**

CINCINNATI 9, OHIO

For more data circle 483 on Reader Service Card

270 modern machine shop

## new shop equipment . . .



Billings Rivet Set (top) and Hand Groover

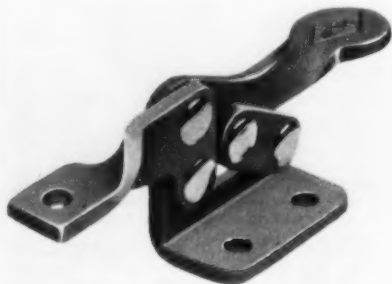
tools have carefully polished heads with shanks finished in Billings Blue lacquered or enameled handles.

For more data circle 113 on Reader Service Card

★ ★ ★

## MIDGET TOGGLE CLAMP IS 2 1/4 INCHES LONG

West Point Mfg. Co., 26935 W. 7 Mile Rd., Detroit 19, Mich., has announced a midget toggle clamp which is only 2 1/4 inches long and 7/8 inches high. According to the manufacturer, the midget clamp has a recommended pressure of 25 pounds and a maximum



Wespo Light-Pressure Midget Toggle Clamp

December, 1955





## STANDARD MACHINE RACKS



The Standard Steel Specialty Company, a pioneer in the machine rack field, has brought an accuracy and finish to this product that cannot be matched by any other company.

This rack is made from special machinery steel finished to our specification . . . cut by expert mechanics on machines designed especially for this work.

Send for our new catalog which gives information on Woodruff keys, taper pins, machine keys, and features a chart for checking machine racks.

### STANDARD STEEL SPECIALTY CO.

BEAVER FALLS

PENNSYLVANIA

Plant: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 484 on Reader Service Card

## MARK IRON, STEEL and CARBIDES



THE  
*Etchograph*  
WAY

Original Electric Etcher, Thousands in Daily Use  
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements.

• Write for circulars and prices.

**BREWSTER-SQUIRES CO.**

P. O. Box 601

Englewood, N. J.

For more data circle 485 on Reader Service Card

December, 1955

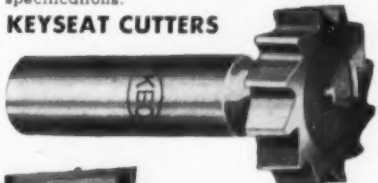


## CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

### KEYSEAT CUTTERS



High speed. Right hand  $\frac{1}{8}$ " shank. Diameter from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



### CENTER REAMERS

High speed steel. Reamers from  $\frac{1}{4}$ " to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made for your specifications.

### LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from  $\frac{8}{16}$ " to 1" are .0005" undersize at small end, from  $1\frac{1}{16}$ " to 3", .001" undersize. Immediate delivery.

Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

## KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

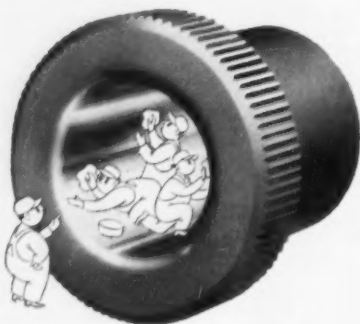
For more data circle 486 on Reader Service Card

modern machine shop 271



## **SUPER FINISH OF UNIVERSAL DRILL BUSHINGS**

**reduces tool wear  
to a minimum**



One sure way to cut excessive tool wear in your operations is to specify Universal Drill Bushings because their superfinish bores help reduce wear on production tools to an absolute minimum, especially in close tolerance work. The blended radius on the top inside diameter helps prevent tool hang-up and breakage. 100% concentricity and hardness tests insure accuracy, uniform high quality and long life. Knurled heads provide a quick, sure grip. Universal Drill Bushings are produced in a complete range of standard sizes and lengths. Orders for special dimensions will receive prompt attention. For complete information, write to the office nearest you—Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wis.—or our home office.

**UNIVERSAL  
ENGINEERING COMPANY**  
Frankenmuth 9, Michigan

171 B

For more data circle 487 on Reader Service Card

## **new shop equipment . . .**

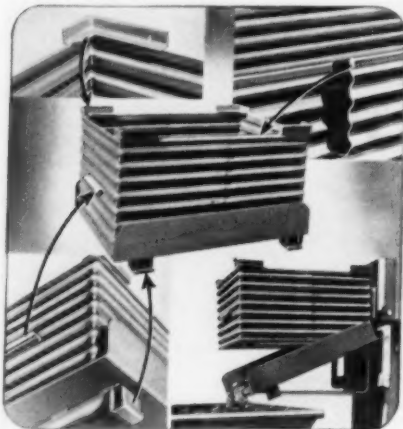
pressure of 40 pounds. The clamp is said to be ideal for those small jobs requiring smaller size clamps with a light pressure for holding.

For more data circle 114 on Reader Service Card

★ ★ ★

## **CORRUGATED ALL-STEEL DROP BOTTOM BOX**

A corrugated all-steel welded drop bottom box which is designed for use either with positioning stand or for controlled dumping by a fork truck has been announced by Palmer-Shile Co., 16022 Fullerton, Detroit 27, Mich. When used on a positioning stand, the legs at the bottom of the box engage the stand and the drop bottom automatically opens to discharge materials into the stand tray. When used for automatic dumping by fork truck, a reinforced box hanger engages the mast of the fork truck for controlled materials discharge into a truck or conveyor. Safety corners are claimed to prevent



Palmer-Shile All-Steel Drop Bottom Box



... for more than  
1001 jobs

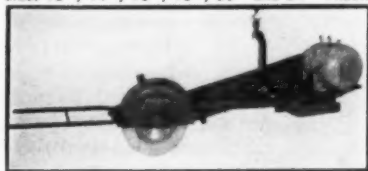


**HJORTH LATHE & TOOL CO.**  
8 BEACON STREET WOBURN, MASS.

For more data circle 488 on Reader Service Card

**MUMMERT-DIXON SWING FRAME GRINDERS**

Sizes 12", 14", 16", 18", 20" and 24" wheels.



Ask for Descriptive Circular  
**MUMMERT-DIXON CO.**  
120 Philadelphia St. • Hanover, Pa.

For more data circle 489 on Reader Service Card

**NEW General**

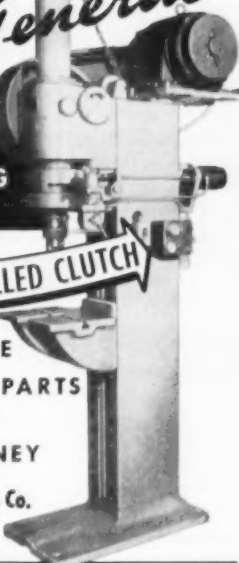
**FLEXIBLE  
POWER  
STRAIGHTENING  
PRESSES**

WITH

**AIR CONTROLLED CLUTCH**

- SLASH TIME
- INCREASE PARTS PER HOUR
- MAKE MONEY

*General Mfg. Co.*  
6433 FARNSWORTH  
DETROIT 11, Mich.



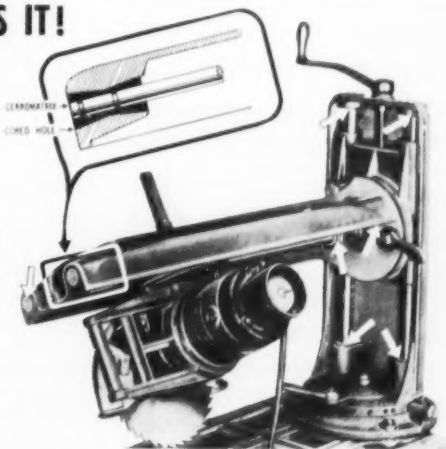
For more data circle 490 on Reader Service Card

**CERROMATRIX DOES IT!**

**Slide Rods Anchored at  
1/2 Cost of Machining  
for Drive Fits.  
HERE'S HOW:**

Grooved slide rods were inserted in cored, oversize holes and aligned in a holding fixture. Cerromatrix was melted and poured in place. When frozen, Cerromatrix expanded to give a tight fit that exceeded the life of the machine. Proven by 20 years in service.

Find out how YOU can save money in anchoring bearings, bushings and non-moving parts in machine building by writing for Bulletin A-1.



**CERRO DE PASCO CORPORATION**



304 Park,

New York 22, N. Y.

For more data circle 491 on Reader Service Card



## **new shop equipment . . .**

box shifting during stacking or when two or more are transported up or down grade by a fork truck. Corrugated rolled steel legs on the bottom of the box lifting plate are reinforced with steel plate.

The all-steel box also has lapped ends for maximum strength and safety.

The box has four-way entrances and is built from any gauge steel to customer dimension and capacity specifications.

For more data circle 115 on Reader Service Card

\*\*\*

## **TURRET LATHE UTILIZES 32-SPEED HEADSTOCK**

Jones & Lamson Machine Co., 521 Clinton St., Dept. MP, Springfield, Vt., has announced a universal saddle-type turret lathe which features a Hydra-Clutch headstock, motor-indexed (Geneva) hexagon turret and preselected automatically changed spindle speeds for each hexagon turret position. The 32-speed headstock has two ranges, each with 16 forward and reverse speeds, powered by a 40-h.p. single speed motor. Spindle speeds within each range can be changed at any time (without stopping the spindle) by a preselector switch with push-button control. These changes are made through solenoid valves which engage or disengage hydraulic multiple disc clutches. Automatic

*"Get them from Gillen"*

### **MACHINE KEYS**

Standard Gib Head and Plain Taper Keys, Straight and Round End Feather Keys. Precision milled, C-1018 Steel; close tolerances; completely de-burred, ready for assembly.

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**MK  
Catalog**

### **MACHINE PARTS**

Every shape and size; milled, drilled, tapped, countersunk, counterbored, heat-treated, surface ground, from various metals. Used by leading machinery builders. Precision made, rigid inspection.

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Catalog**

### **KEYS • PARTS • PINS**

### **GILLEN GROOVE PINS**

Just drill hole, Drive in pin. 3 grooves compress pin for tight fit. Stocked many lengths and diameters. For fast, production fastening. Eliminate threading, tapping, reaming. Various metals and finishes.

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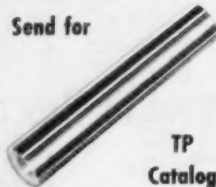


**GGP  
Catalog**

### **TAPER PINS**

Straight to taper,  $\frac{1}{4}$ " per foot. Extremely accurate. Milled from bar stock; also centerless ground. Rust-resistant coating. Stocked many lengths and diameters.

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**TP  
Catalog**

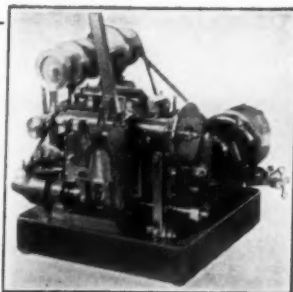
*John Gillen Company*

**Manufacturers**

2542 S. 50TH AVE., CICERO 50, ILLINOIS

For more data circle 492 on Reader Service Card





## WALTHAM

### Pinion and Gear Cutting Machines

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1 1/2" dia. Blanks are held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut.

### WALTHAM MACHINE WORKS, INC.

BOX 48 • WALTHAM, MASS.

Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.

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• Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.  
96 Silliman Ave. Bridgeport 3, Conn.

For more data circle 494 on Reader Service Card

December, 1955

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Accurate Feeding —  
Reversible  
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Low Cost



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Fits any Power  
Press  
Electrical Plug  
Installation.  
Pays for itself  
you get more  
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### STOCK OILER

Saves your dies  
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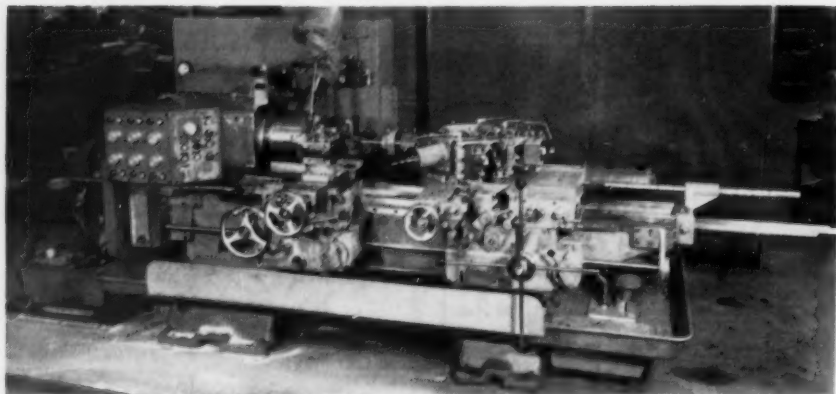
136 SOUTH WATER STREET, PROVIDENCE 3, R. I.

For more data circle 495 on Reader Service Card

modern machine shop 275



**new shop equipment...**



**Jones & Lamson Universal Saddle-Type Turret Lathe equipped with Hydra-Clutch headstock**

speed selection and change is provided for each face of the hexagon turret by means of a secondary panel having six preselector switches. Speeds so obtained can also be changed at any instant by a master preselector switch and push button.

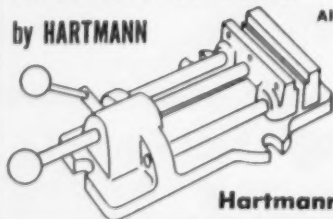
All conventional headstock controls are by switch or push button. These include start and stop motor, start and stop spindle, spindle jog and direction of spindle rotation. High and low speed ranges, also free spindle position, are manually selected by lever operated sliding gears while the spindle is stop-

ped. Basic spindle speeds available for the 2½-inch hole spindle are a low range of 30 to 527 r.p.m. and a high range of 89 to 1,542 r.p.m. Six additional range groups are available by accessible change gears, providing a total spread of 18 to 2,550 r.p.m. The 4½-inch hole spindle has a basic low range of 20 to 341 r.p.m. and a high range of 58 to 998 r.p.m. Additional change gears provide a total spread through six range groups of 10.5 to 1,491 revolutions per minute.

The hexagon turret is indexed, in one direction only, by a separate motor

## **INSTANT ACTION**

by **HARTMANN**

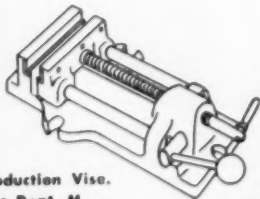


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All Purpose Tool Room And  
Machine Shop Vises.

## **The JAWSET**

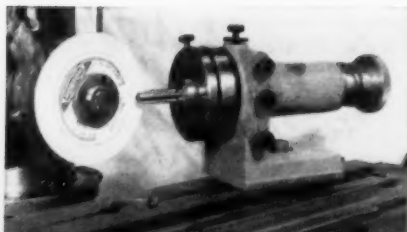
Adjustable Pressure Production Vise.  
For Information Write Dept. M.



**Hartmann Mfg. Co., 1637 Goult St., Racine, Wis.**

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### Atlantic RADIAL RELIEVER

A low-cost means of grinding uniform radial relief on taps, countersinks, step drills, gun drills, reamers, etc.

Quick setting for: 2 to 6 flutes, right or left hand operation, amount of relief. Write for folder.

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91 PRESCOTT ST. WORCESTER 5, MASS.

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### NEW! IMPROVED SQUARE BLOCK GAGING SYSTEM

\* Surface finish of at least two-tenths R. M. S. reduces calibration error to a new low.

\* New accessories extend range of usefulness.



Construct Fixed or Indicating Gages With Square Gage Blocks

DoALL's Square Block Gaging System provides easy-to-use accessories for constructing: Indicating gages, multiple gages on one base, scribes, pin gages...all gage block accurate!



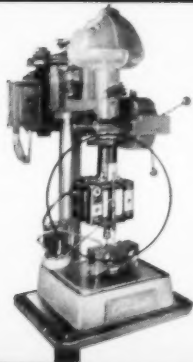
Call DoALL. See classified phone directory for nearest DoALL Service-Store, or write:

The **DoALL** Co.  
Des Plaines, Ill.

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### TIPS for PROFITABLE TAPPING

### Commander LĒAD-MATIC TAPPER



#### High Production Automatic Lead Screw Tapper

Put a Commander Lēad-Matic Tapper on *any* drill press and you're ready to handle any tapping job — precision or otherwise. Designed to handle a very wide range of taps, Lēad-Matic operation is simple and foolproof — even inexperienced operators produce precision threads. The Lēad-Matic's electrically controlled cycle or jog tapping actions provide versatility to handle any job. Ruggedly built for trouble-free service.

#### Features That Help You Tap Better

- Precision ground lead screws insure finest thread.
- Automatic tap reversal — no drill press motor reversing — faster work.
- Hand, foot or fixture switch controls.

Your Nearby Commander Distributor has the Lēad-Matic—see it soon

**Commander MFG. CO.** 4224 W. KINZIE STREET  
CHICAGO 24, ILLINOIS

For more data circle 499 on Reader Service Card



## new shop equipment . . .

through a Geneva mechanism. Buttons on a control spool determine the skip or stop positions. Indexing is by power only and takes place automatically after the turret has been returned in fast motion to contact the adjustable index stop bar. According to the manufacturer, these features improve production

through correct cutting speed control, reduced operator fatigue and reduced machine handling idle time.

For more data circle 116 on Reader Service Card

★ ★ ★

## BROACH ROTATES AS IT CUTS

Shearcut Tool Co., 7045-M Darby Ave., Reseda, Calif., has announced a taper shank rotary broach which rotates as it cuts. The tool is made with

high spiral or helical cutting edges, and when end pressure is applied, the helical cutting edges remove metal in a Shearcutting manner. According to the manufacturer, the rotary broach produces absolutely accurate holes with an unusually good finish. The chips removed resemble steel wool in both form and texture. The cutting edge of the rotary broach forms a circle; consequently, there is claimed to be no tendency to produce elliptical, bell-mouthed or uneven holes. The rotary broach can usually be re-sharpened 10 to 30 times to prolong their useful life. Taper shank rotary broaches are available in sizes from

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# NELCO TOOLS

NELCO TOOL COMPANY, INC., MANCHESTER, CONNECTICUT

For more data circle 500 on Reader Service Card

For that Extra  
**EDGE** in Production



# New NUMBERALL

## LOW COST

### MULTI-WHEEL NUMBERING MACHINE



Model 60

Numberall introduces Model 60, similar in performance to the famous Model 70 but much simplified in construction and lower in cost.

A single locking pin, thrust through the frame and fitting into wheel slots, holds the wheels in place and in perfect alignment. The wheels have eleven divisions with engraved characters from 0 to 9 and one blank space. Model 60 can be furnished with 2, 3 or 4 wheels and in character sizes of 1/16", 3/32" or 1/8".

Model 60 is made for hand stamping all kinds of products and parts of light metals, unhardened steel, etc.

Write for Bulletin MS 60.

**NUMBERALL STAMP & TOOL CO.**  
HUGUENOT PARK STATEN ISLAND 12, N. Y.

For more data circle 501 on Reader Service Card

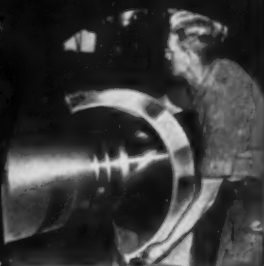
# HOLLOW-FRAME MICROMETERS

## Reduce Gaging Errors

Up to 50% less weight

Lessens fatigue, assures accurate gaging, better balance and feel

Minimizes expansion and contraction



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DoALL

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Or Write

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Sizes up to 96"

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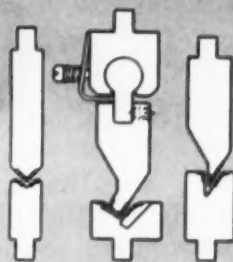
## INDUCTION HARDENED PRESS BRAKE DIES

for greater die life at no extra cost  
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Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO dies for your next press brake job.

4915

Steel Bending Brakes for over 50 Years



Heavy lines  
indicate  
hardened surfaces

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**new shop equipment . . .**



**Shearcutter Taper Shank Rotary Broach**

1/4 to 1 inch in increments of 1/32 inch, and from 1-1/16 to 1 1/2 inches by sixteenths.

For more data circle 117 on Reader Service Card



The lapped finish on the hard knurling surface of the knurl contributes to outstanding performance and longer life.

Over 100 styles and sizes in stock.  
Special knurls to your specifications.

## **REED ROLLED THREAD DIE CO.**

Thread Rolling Machines and Dies, Thread Rolling Attachments,  
Thread Rolls and Knurls for Automatic Screw Machines and Turret Lathes  
WORCESTER, MASSACHUSETTS, U. S. A.

For more data circle 504 on Reader Service Card

## **TAPPING ATTACHMENT FEATURES LARGE CAPACITY**

Tapmatic Corp., 845 W. 16th St., Costa Mesa, Calif., has announced the "700" Tapping Attachment which was designed especially to meet the demand by present users of the Tapmatic "300" and "500" for a larger capacity attachment. The "700" unit has a capacity ranging from 1/4 to 1/2 inch. It operates on the "weightless tapping" principle

and does not require any lead pressure by the machine operator during the tapping operation. This feature is claimed to assure consistently uniform tapped holes, long tap life and fast tapping production. Another unique feature of the attachment is a positive torque adjustment clutch which stops



**Tapmatic "700" Tapping Attachment**



# DOWEL PINS



## Immediate Delivery!

Standard Size Dowel Pins from  $\frac{1}{8}$ " to 1" diameter and from  $\frac{3}{8}$ " to 6" length supplied in .0002" and .001" over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

Dealer inquiries invited.

**SCHULTZ & ANDERSON CO**  
118 EDISON PLACE,  
NEWARK 5, N.J.

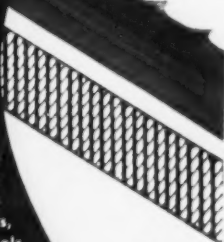
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• Finish with DoALL File Bands... up to 4 times faster than jig filing and up to 9 times faster than hand filing.

**DoALL**  
Saw  
Bands  
18 Types



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14 Types

Call DoALL—

Consult classified directory for nearest DoALL Service-Store stocking saw bands, band files, cutting tools, supplies, or write:

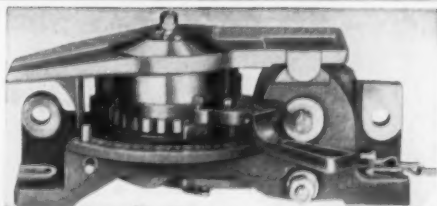
**The DoALL Co.**

Des Plaines, Ill.

50

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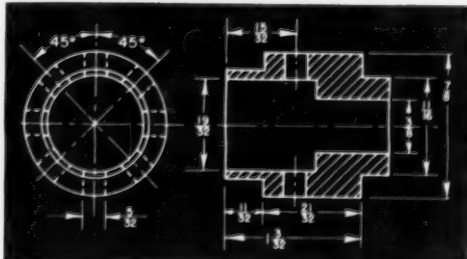
## CUT COSTS ON SECONDARY OPERATIONS WITH THE DEARBORN AUTOMATIC CHUCKING AND INDEXING FIXTURE



### Features:

1. Work held by collets
2. Automatic opening and closing
3. Work automatically ejected
4. Automatic indexing if required
5. Three models with capacities from  $\frac{1}{32}$ " to 2"

Write for illustrated data.  
Send blueprints or specifications  
of work.



This piece was made from Brass. It was necessary to drill all holes from the outside to minimize the burring time. Production was about 100 pieces per hour or 800 holes per hour.

**J. W. DEARBORN**  
ANSONIA • CONN.

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## new shop equipment . . .

the tap instantly when the tap becomes dull, loaded, hits a hard spot or bottoms in blind hole tapping. This spring-loaded ball clutch is said to reduce tap breakage and work spoilage. The function of the clutch is not affected by r. p.m. variations, oil or heat, and simple design makes it impervious to wear.

The reversing mechanism of the attachment permits the instantaneous reversal of the tap at any time. It is so designed that the reversing torque is automatically adjusted simultaneously with the driving torque through the one adjustment of the positive mechanical clutch. The reversing mechanism has an all ball-bearing construction. The attachment incorporates the use of the Jacobs Rubber-Flex Tap Chuck which will accommodate all the taps within its rated capacity and does not require individual tap holders.

For more data circle 118 on Reader Service Card

★ ★ ★

## SHORT-RUN STAMPINGS

Metal pieces that look like watch parts and elements of fine camera shutters can be economically stamped out of sheet steel, brass and aluminum at Federal Tool and Mfg. Co., 3615 Alabama Ave., Minneapolis 16, Minn. The cost-cutting stamping process is a refinement and extension of accepted stamping techniques developed during years of experience, rather than any radical new departure in method. The new method is said to enable Federal

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Precision drilling and reaming requires bushings. When you are called upon to build or service a jig or fixture you need bushings right at hand. A shortage at a critical time can cause lost production.

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JOB

Piloted  
Special Lengths  
Special Diameters  
Combination Cutting

# Schmarje

**CARBIDE REAMERS**  
STRAIGHT OR TAPER SHANK

Send drawings for Prompt Quotations

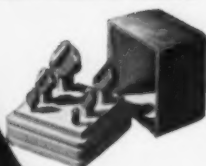
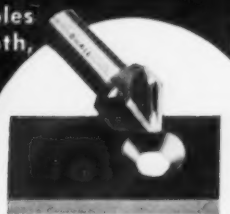
**SCHMARJE TOOL & ENGINEERING CO.**  
Carbide Reamers • Form Tools  
MUSCATINE 3, IOWA

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... produce holes  
with a smooth,  
valve-seat  
appearance

New off-center  
flute design.  
Shears metal  
— does not  
gauge. Pro-  
vides faster,  
more accurate  
cutting. Lasts  
longer. Available  
in H. S. Steel.



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directory for nearest  
DoALL Service-Store—  
complete stock of gages,  
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Sets available  
in 60°, 82°,  
90°, 100°,  
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angles

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insure  
accurate  
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part for an  
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engine.



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matched prismatic lenses give needle-sharp mag-  
nification. Comfortably light weight. Fits over  
regular glasses. Leaves both hands free. Normal  
vision may be resumed by lifting head.

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With Third Dimensional (3-D) Vision  
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Magni-Focuser—the binocular magnifier—reduces  
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Magni-Focuser. Speeds precision assemblies, blue  
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## new shop equipment . . .

to stamp out shapes with lateral sections thinner than the metal sheet stock from which they are stamped. Flat pieces or three-dimensional parts can be produced, as desired. Intricate cams and other parts for precise mechanisms can be made, and the new process is claimed to be equally appropriate for economical production of non-moving

parts, letters of the alphabet, trademarks, insignia and decorative designs in sheet metal.

For more data circle 119 on Reader Service Card

★ ★ ★

## 1 1/2-TON DEEP-THROAT PRESS FOR FAST, PRECISION STAMPING

Kenco Mfg. Co., 5211-A Telegraph Rd., Los Angeles 22, Calif., has announced a 1 1/2-ton 7-inch deep-throat

press which is designed for fast, precision stamping with deep-throat features, affording minimum down-time and long service life. The new unit becomes a companion to the Model 1, Standard, press. Construction features include a solid one-piece alloy-steel crankshaft, heat treated and precision ground. The crankshaft is of the eccentric style with a 3/4-inch standard stroke. Strokes up to 1 inch or under are available as extra. The flywheel is carried on roller bearings. Extra-long V-type ram ways give precision guidance throughout entire ram travel, with Sorbomat construction for long wear. The press frame is of

**PRECISION**

# *Machine Tool Attachments*

with endless versatile variations

**TRAVERSE SLIDES FEEDS TABLES**

**SPINDLES—MOTORIZED OR BELT DRIVE**

**FOR WORK HEAD OR GRINDING WHEEL**

**DO IT YOURSELF!**

- Select a STANDARD Precision Spindle and/or Work Head . . .
- Assemble with STANDARD Feeds or Traverse . . .
- To convert your old machine tool . . .
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8"x21" Precision (Tilting) Table



360° Swivel



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Precision Spindles No. 6000 Series



Hydraulic Anti-Friction (Ball Bushing) Traverse



Catalog on Request



Work Head or Grinding Spindles

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## the STANDARD electrical tool co.

**MACHINE TOOLS**

2487 RIVER ROAD • CINCINNATI 4, OHIO

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## 6" Universal Dividing Head

with  
**DIRECT INDEXING**

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

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3525 Cordiff Ave. • Cincinnati, Ohio

## Get More Holes With DoALL Jobber Drills

Only DoALL has XL Drills (No. 60 through 1/4")

- Ground from solid
- Special surface treated edges
- Bright polished flutes
- Last longer, stay sharper
- More holes per grind

**General Purpose** — for short runs or production

**Heavy-duty Split Point** — for stainless and other heavy duty work

**"Hy" Helix** — for deep holes in aluminum and other light materials

**Call DoALL**  
— see classified directory for nearest DoALL Service-Store, or write:

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Des Plaines, Illinois 43

• 17/64" through 1/2" are milled

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For more data circle 514 on Reader Service Card

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for **HOLDING CLOSE TOLERANCES  
CONSISTENT GOOD FINISH  
FAST STOCK REMOVAL**



\* Patent Pending

BOTH STANDARDS  
AND SPECIALS AVAILABLE.  
SEND FOR LITERATURE TODAY.

THE  
**MAXWELL**  
COMPANY

**BEDFORD, OHIO**

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**new shop equipment . . .**

the multiple-rib design with high tensile strength and unusual rigidity. The ram hole is 1 inch in diameter and 1½ inches deep. The ram area front to back and left to right is 2¼ x 2¼ inches. Distance from the center of the

**BARKER Bench Type MILL**

**for Production Milling  
of Small Parts by  
Unskilled  
Help**

**\$295.00**

As Shown



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Optional**

**at Extra  
Cost.**

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COMPANY**

500 GREEN RD., CLEVELAND 21, OHIO

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**Kenco 1 1/2-Ton 7-Inch Deep-Throat Press**

ram to the back of the press is 7 inches. The bolster plate is 4⅝ x 6⅝ x ¾ inches.

The driving mechanism is self-contained in the clutch collar and requires no weakening slots in the crankshaft. To ensure positive punching and long wearing, the flywheel is fitted with a companion drive plate, heat treated and precision ground, which is said to serve as a virtually indestructible drive. The press is equipped with single-trip

**For BIG Savings at little cost**

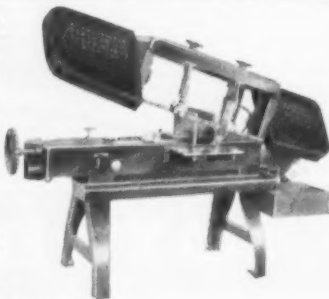
**Variable Speed Drive—Now Standard Equipment**

**MODEL L** — the economy, special precision guides for longer blade life. Floor space only 20" x 66". Send for FREE CATALOG today!

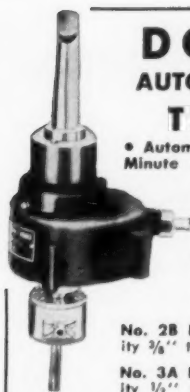
9" x 16" capacity. One-piece welded frame lowers hydraulically. Easy blade adjustment for proper cutting. Quick blade change from top of machine. Spe-

**W. F. WELLS & SONS  
THREE RIVERS, MICHIGAN**

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## DORMAN AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.

**No. 1A FRICTION DRIVE TAPPER** — capacity No. 2-55 to  $\frac{3}{8}$ " in Steel —  $\frac{1}{2}$ " in Aluminum.

**No. 2B POSITIVE TAPPER** — capacity  $\frac{3}{8}$ " to  $\frac{7}{8}$ " in Steel.

**No. 3A POSITIVE TAPPER** — capacity  $\frac{1}{2}$ " to  $1\frac{1}{4}$ " in Steel —  $\frac{1}{2}$ " to  $\frac{3}{4}$ " Pipe Taps.

**No. 4A TAPPER** — capacity  $\frac{3}{4}$ " to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from  
**\$50.00**  
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**IMMEDIATE  
DELIVERY**

**THRIFTMASTER PRODUCTS CORPORATION**

Division of Thomson Industries, Inc.

1034 N. PLUM STREET, LANCASTER, PA.

STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL FIXED CENTER DRILLHEADS

For more data circle 518 on Reader Service Card

## DoALL-ENGINEERED HSS CUTTERS

Increase Milling Production  
because:

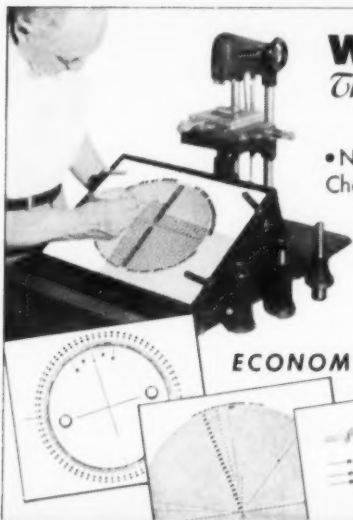
- Made from forged blanks — dense structure permits finer edges
- Vapor blasted to remove burrs, increase life
- 64-65 °C° scale hardness guaranteed

Call DoALL — consult classified phone directory for DoALL Service-Store that stocks gages, cutting tools, supplies, — in *Wisconsin*

The DoALL Co.

19

For more data circle 519 on Reader Service Card



## WILDER PROJECTOR *The MICRO-PROJECTOR with the VERTICAL DESIGN*

- New Gage Company Precision Plastic Comparator Charts made on non-changing, unbreakable material; available for 360° angular checking, radii, threads and special charts to your specifications.
- The Wilder so equipped will inspect faster, more accurately, without the need of to-scale manually built drawings.

**ECONOMY • ACCURACY • MODERATE PRICE**

**Geo. SCHERR OPTICAL TOOLS, Inc.**

200-MM LAFAYETTE ST., • NEW YORK 12, N. Y.

For more data circle 520 on Reader Service Card

December, 1955

modern machine shop 287



## new shop equipment . . .

control which is claimed to eliminate lost motion and provide safe and positive single-trip action. The single-trip control requires only from 1 to 2 pounds of operating pressure. The 1½-ton press is available as a bench model; however, floor legs can be furnished as extra, if desired. The machine can be supplied with either single or double

hand control or with foot control. It is a solid back press and has the inclinable feature.

For more data circle 120 on Reader Service Card

★ ★ ★

## DRILL PERFORMS TWO OR MORE OPERATIONS IN ONE PASS

Chicago-Latrobe, 419 W. Ontario St., Chicago 10, Ill., has announced a line of Subland Drills which are combina-

tion drills having separate margins for each of the two or more diameters that extend the full length of the flutes. The drills are used where it is desired to perform two or more operations in one pass of the tool. The two diameters may be so ground that they can be used to drill and counter-sink for flat head machine screws, or to drill and counterbore for socket head screws, or to drill and single or double radii form a counterbored hole. The drills with two or more diameters are most extensively applied on high production jobs where they are used to machine holes of various diameters and angles or radii. Up to four diame-



Actual overall length horizontal models: 3½", 5", 6".

## "ADJUSTABLE STROKE" MIDGET *Air-Clamp* CYLINDER

Now—put pressure where it's wanted instantly and cheaply, with Mead's powerful new midget air cylinders (1" bore, single-acting, spring return—horizontal and vertical). Stroke is adjustable. Cut costs—use 'em singly or in groups to move, hold, press or eject small work pieces; to close and open large jigs, forms, fixtures. They'll replace human fingers and mechanical clamps in countless routine jobs.

### Catalog Free!

Write for new fact-and-picture-packed Air Power Catalog—or ask your nearest Mead Man!

**PATHFINDER IN AIR POWER AUTOMATION**

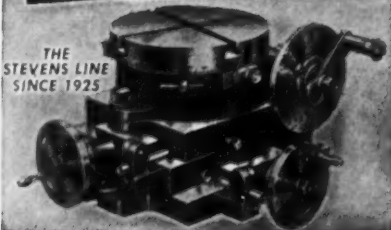
**MEAD**  
SPECIALTIES COMPANY  
4114 N. KNOX AVE., DEPT. AA-125  
CHICAGO 41, ILLINOIS

For more data circle 521 on Reader Service Card



**COMBINED TRANSVERSE AND  
CIRCULAR MOVEMENTS ON  
STEVENS #1 COMPOUND TABLE**

THE  
STEVENS LINE  
SINCE 1925



Combines  $3\frac{3}{4}$ " longitudinal and  $3\frac{3}{4}$ " transverse movements with circular movement of  $7\frac{1}{2}$ " Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

WRITE FOR BULLETIN

Rotary Tables • Multiple Spindle Index  
Centers • Vises • Screw Head Slotters

**The John B. Stevens Company**

Main Street, Somersville, Conn., U. S. A.

For more data circle 522 on Reader Service Card

**CLAW-TOOTH®  
SAW BANDS**

**Saw All Metals, Plastics,  
Wood Faster Than Ever**

- Positive rake teeth take deeper bites—pull themselves into the work.
- Hardened teeth last longer than spring tempered types.
- Welded lengths to fit any make contour or cut-off band machine or 100' and 500' coils.

- Also available — Sensational Demon® Claw Tooth Saw Bands of High-Speed Steel.

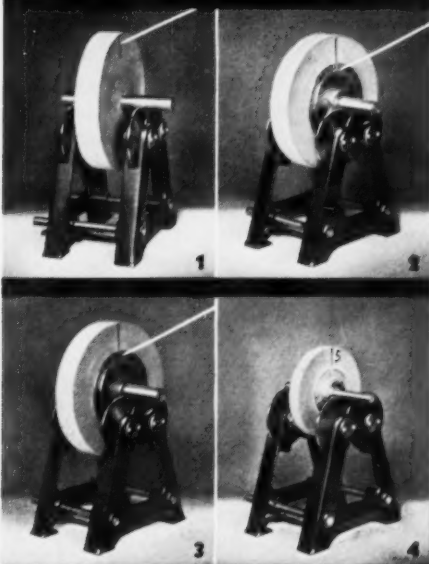
For all band machining needs —  
Call DoALL. See classified directory  
for nearest DoALL Service Store,  
or write,

**The DoALL Co.**

46

Des Plaines, Ill.

For more data circle 523 on Reader Service Card



**QUICK, EASY WAY  
TO BRING GRINDING,  
BUFFING, AND POLISHING  
WHEELS INTO BALANCE...**

(1) Balance on Anderson super-sensitive Balancing Way and mark light side. (2) Line up mark with both zeros on Anderson Speedi-Balancer. (3) Turn both discs till wheel balances. (4) Record setting. Wheel is now prebalanced for instant use when needed: just use Speedi Balancer, set to number marked, as outside collar. Save time. Eliminate weights. Reduce vibration. Increase motor bearing life. Improve motor performance. For information on sizes, types, and prices of Anderson Balancing Ways and Speedi-Balancers, write for Bulletin 12-22.

**ANDERSON BROS. MFG. CO.**

ROCKFORD, ILLINOIS

For more data circle 524 on Reader Service Card



**new shop equipment . . .**



ter drills, dependent on sizes and applications, are available.

To obtain best results with this type of drill, the difference between the smallest and largest diameter should not be too great because of the variation in cutting speeds and feeds. For best results the largest diameter should

**Chicago-Latrobe Subland Twist Drill**

not be more than twice as large as the smallest diameter. Since the drills are constructed so that the margin of each diameter is cylindrically ground for the full length of the flute, repeated sharpenings can be made without affecting the separate diameters. All the drills are considered special tools and are made to user specifications.

For more data circle 121 on Reader Service Card

★ ★ ★

**UNIT PROTECTS  
AIR-OPERATED  
EQUIPMENT**

To help the users of air-operated cylinders, valves and tools get maximum service life out of their equipment, A. Schrader's Son, Division of Scovill Mfg. Co., Inc., 461 Vanderbilt Ave., Brooklyn, N. Y., has announced the "Lub-air-ator," a combination air filter, regulator and lubricator. The unit is fully automatic and can be easily cleaned and serviced without removing it from pipe line. The fil-

**CLIP THIS to get  
KEYWAYS for 1¢ Each**

**The duMONT CORPORATION  
Greenfield, Massachusetts**

MAIL FREE BROACH CATALOG AND  
PRICE LIST 5 describing 26 standard kits, 49  
standard broach sizes, 59 bushing sizes, standard  
square, hexagonal and production type broaches  
and a wide range of SPECIAL BROACHES to

Name .....

Company .....

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**HS SQUARE  
BROACHES**



**HS HEXAGON  
BROACHES**

With a *Minute Man* Keyway Broach Kit you can cut your own keyways by hand for as little as a cent a piece. You'll have the job done in *one minute*, far quicker, far cheaper than setting up an expensive machine tool. Kits are available to handle keyways from  $\frac{1}{16}$ " to 1" in any bore from  $\frac{1}{4}$ " to 3".

*Minute Man* High Speed Steel Square Broaches, Hexagonal Broaches and Production-type Keyway Broaches are available from stock at your Industrial Distributor's in a wide range of sizes.

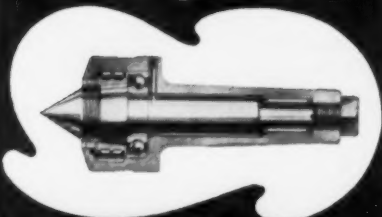
**The duMONT CORPORATION, Greenfield, Mass.**

See them at BOOTH 406—PLANT MAINTENANCE SHOW—Philadelphia  
For more data circle 525 on Reader Service Card



# NIELSEN

## Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog  
M on live centers

**NIELSEN, INC.** LAWTON, MICHIGAN

For more data circle 528 on Reader Service Card

## DoALL ADJUSTABLE THREAD RING GAGES

remain perfectly round through full range of adjustment and retain setting while in use.

2½ to 12 times  
longer life —  
over 50% less  
weight than  
conventional  
gages



Call DoALL — consult  
classified phone directory  
for DoALL Service. Store  
that stocks gages, cutting  
tools, supplies, or Write

DoALL Co.  
P.O. Box 1100  
15

Also Thread Plug Gages,  
Cylindrical Plug and  
Ring Gages, and  
Master Setting Discs

For more data circle 527 on Reader Service Card

## YOUR Guarantee OF BETTER SET-UPS

On tapping and reaming jobs, there is one sure-fire way of making more perfect set-ups—and that is to use Ziegler Floating Tool Holders.

Unlike ordinary tool holders, the Ziegler does not require that the set-up be made with absolute accuracy in order to insure perfect work. Just come within 1/32" of center on the radius (1/16" on the diameter) and the Ziegler automatically compensates for the inaccuracy.

Follow the practice of always using Ziegler Floating Tool Holders and you can be sure of having set-ups that insure greater precision in the work performed. PROMPT DELIVERY!



**Ziegler**  
ROLLER  
DRIVE

**W. M. ZIEGLER TOOL CO.**

**FLOATING HOLDER**  
for Taps and Reamers...

13566 AUBURN  
DETROIT 23, MICH.

WRITE FOR  
CATALOG

For more data circle 528 on Reader Service Card



## new shop equipment . . .

tering unit has a large-area sintered-bronze filter, baffle plate and drain cock for blowing out water and accumulation of foreign matter. The regulator adjusts air flow from 250 p.s.i. inlet pressures down to 5 to 125 p.s.i. by simply turning the regulator

Over 85% of the torque wrenches used in industry are

### Sturtevant TORQUE WRENCHES

*Read by Sight, Sound or Feel*

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

*in inch grams  
...inch ounces  
...inch pounds  
...foot pounds*

Every manufacturer, design and production man should have this valuable data. Sent upon request.

PA. **Sturtevant CO.**  
ADDITION QUALITY IS EASY

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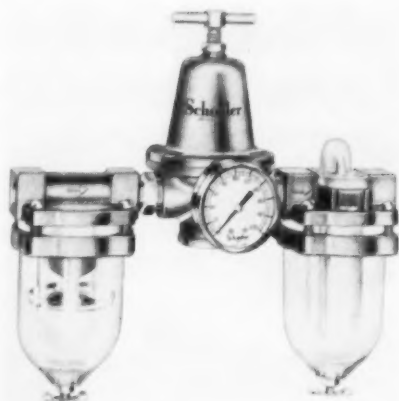


Illustration of Schrader "Lub-air-ator"

handle. The pressure gage can be mounted in the front or rear of the regulator.

The lubricator unit has a vibration-proof adjustment thumb wheel which regulates oil flow from a steady flow down to intermittent drops as needed. The transparent bowl which holds a full half pint, shows the oil level at all times. Refilling is accomplished through a special built-in sliding seal covered port without shutting off the air flow. Another special feature of the lubricator is the "sight feed" which permits users to see if the oil is flowing in the desired quantities. The "Lub-air-ator" is available in three sizes with

*You Need an Extra Hand Now  
to Speed Up Production!*

### HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

IN 11 SIZES—No. 6 to 1"  
N.C. in all S.A.E. sizes.

**HEIMANN MFG. CO. • URBANA, OHIO**

For more data circle 530 on Reader Service Card



**ESSEX**  
*Precision*

**CARBIDE & HIGH SPEED CUTTING TOOLS**



<b>CARBIDE TOOLS:</b>	<b>HIGH SPEED STEEL TOOLS:</b>
Burrs	Rotary Burrs
End Mills	Rotary Files
Reamers	Chatterless
Burr Sets	Countersinks
Special Tools	Special Tools

*All U.S. Steel & Carbide Tools salvaged and resharpened (Write for catalogue)*

**ESSEX ROTARY FILE & TOOL CORP.**  
Makers of Fine Tools Since 1868  
295 MADISON AVE. NEW YORK 17, N. Y.

For more data circle 531 on Reader Service Card

**DoALL**  
**SAW BANDS**

MADE SHARP!  
TO STAY SHARP!

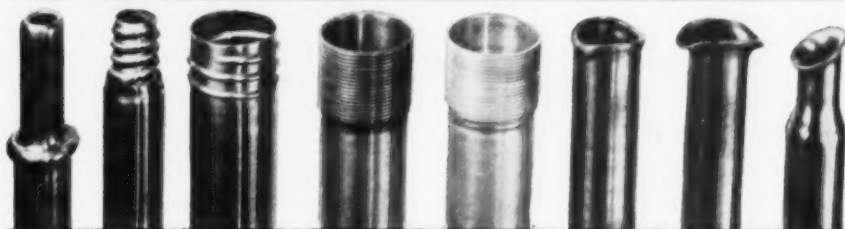
- Super-sharp, super-hard tooth.
- Engineered gullet for smooth chip flow.
- Teeth securely "anchored" to flexible back.

You get more mileage out of DoALL Saw Bands on any make of bandsawing machine. Prove it to yourself. Try one against any other blade.

 **Call DoAll**  
—let your DoALL Sawing Specialist select the blade that's best for your job.  
Saw Bands... Cutting Tools... Gages... Tool Steel—in Stock.

51

For more data circle 532 on Reader Service Card



**Jobs like these and many others are handled on**  
**VAILL TUBE-END FORMING MACHINES**

**BEADING  
FLARING  
EXPANDING**

**REDUCING  
SINKING  
SWAGING**

**GROOVING  
DOUBLE LAP FLARING  
FLANGING**

These operations are performed on Vaill Machines on all materials from 1/8" to 6" diameter; available for single or multiple operation work... air, hydraulic and mechanical operated.

Send for General Bulletin G-3; outline your problems.



**THE VAILL ENGINEERING COMPANY**

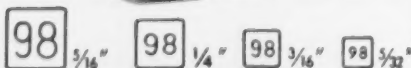
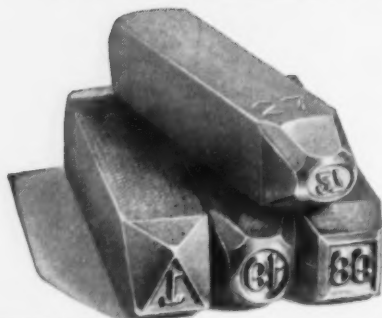
133 E. MAIN STREET

• WATERBURY 20, CONN.

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# INSPECTORS' and CODE SYMBOL STEEL STAMPS...



ACTUAL SIZE OF IMPRESSION

... for quality control  
IN YOUR PLANT ... quick  
identification of inspector, com-  
pany or part supplier, machine  
operator, shift, operation, etc.

... for the mark of controlled  
quality on your product.

YOUR CUSTOMERS recognize your  
inspection mark as a symbol of in-  
sured dependability.

Identification numbers from (1) to (99), inside  
standard  $\frac{3}{32}$ ,  $\frac{3}{16}$ ,  $\frac{1}{4}$  and  $\frac{5}{16}$  inch borders.  
Special sizes and symbols on request.

Write for complete Catalog NM-51.

## NEW METHOD STEEL STAMPS, INC.

147 Jos. Campau • Detroit 7

For more data circle 534 on Reader Service Card

294 modern machine shop

## new shop equipment . . .

$\frac{1}{4}$ ,  $\frac{3}{8}$  or  $\frac{1}{2}$ -inch N.P. threads. The filter, regulator and lubricator can also be supplied as individual units, as well as in pairs.

For more data circle 122 on Reader Service Card

★ ★ ★

## SENSITIVE MACHINE DRILLS HOLES UP TO $\frac{1}{8}$ INCH IN DIAMETER

Designated as the Model MD, a precision sensitive drill press which is designed for drilling holes from the smallest up to  $\frac{1}{8}$  inch in diameter in all drillable materials has been announced by Sloan & Chace Mfg. Co., 344 Hickory St., Kearny, N. J. The column and base of the column is a one-piece cylindrical casting, ground to fit the strongly reinforced spindle bracket and table sleeve. The spindle and spindle bushings are of hardened steel and are ground and lapped to a perfect fit.

According to the manufacturer, the spindle is actuated by an operating lev-



Sloan & Chace Model MD Drill Press

December, 1955



**STEEL**  
**Stanho**  
**PRODUCTS**

**MACHINE KEYS**  
 ALL TYPES

Woodruff Keys Machine Rock  
 Taper Pins • Straight Pins  
 Cotter Pins and Other  
 "Stanho" Steel Products



PRECISION ACCURACY  
 M-2

**STANDARD**  
 HORSE NAIL CORP.  
 NEW BRIGHTON, PA.

For more data circle 535 on Reader Service Card

**CHECK YOUR "MIKES"**  
 the fast, accurate way

**New DoALL Set**  
 checks readings  
 and spindle  
 surfaces

- Three Gage Blocks
- Two Optical Flats
- Accessories
- Millions Accuracy



**Call DoALL**

See classified phone directory for nearest DoALL Service Store—complete stock of gages, cutting tools, supplies.

**Or Write:**  
 The DoALL Co.  
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For more data circle 536 on Reader Service Card

**STERLING**  
**"TOP RIM"** CONSTRUCTION  
**MAKES THE BIG DIFFERENCE**



• Our "TOP RIM" construction provides stronger support all around the box—no corner inserts to come loose and fall out. We invite comparison in design, construction and price.

Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

**WRITE FOR LITERATURE AND PRICES.**

**Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.**



Sterling Bin Front "Top Rim" Steel Stacking Box. Size 18" x 12" x 6".



Sterling "Top Rim" Steel Stacking Box with drop handles. Size 18"x12"x6".

**Sterling**  
 Quality Handling & Storage Equipment




For more data circle 537 on Reader Service Card



## new shop equipment . . .

er connected to the spindle by a ball bearing link which eliminates all end play in the spindle movement. The spindle travel is controlled by an adjusting screw mounted in the spindle bracket. The totally enclosed ball bearing motor mounted on a sliding base permits easy speed changes over the

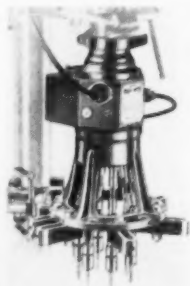
complete range of eight speeds from 2,000 to 9,900 r.p.m. A speed chart is mounted on the motor base.

For more data circle 123 on Reader Service Card

★ ★ ★

## MULTI-SPINDLE HEAD TAPS EIGHT HOLES AT ONCE

Identified as the "Multi-Tapper," a high production, universally adjustable, multiple spindle tapping head, capable of tapping up to eight holes in any pattern with taps of different pitch and made to fit any drill press, has been announced by Commander Mfg. Co., 4224 W. Kinzie St., Chicago 24, Ill. The unit incorporates an electrically - controlled, automatically reversing spring clutch drive through which a single drill press spindle



Commander "Multi-Tapper" Tapping Head

## NOW YOU CAN CUT MACHINING COSTS

### NU-TOOL

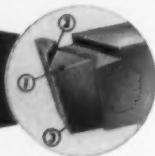
MECHANICAL  
TOOL  
HOLDERS



USED WITH  
NP CARBIDE  
"THROWAY" INSERTS

### *Accurate Indexing... Rugged Design*

HERE'S  
WHERE THE  
DIFFERENCE  
PAYS OFF



When used with NP Controlled Quality Carbide "Throway" inserts, the NP NU-TOOL Mechanical Tool Holder paves the way toward faster production and increased production savings for you. Call your nearest Newcomer Sales Engineer . . . let him show you why NU-TOOLS can cut your machining costs.

1. Solid, hardened and precision ground tip-seating surface (no shims required)
2. Solid backing for cutting thrust . . . both insert and clamp register against solid stops.
3. One-piece alloy steel holder heat-treated to 40-45 Rockwell "C".
4. Only 3 parts mean lower first cost . . . fewer replacement parts . . . smaller inventories . . . Carbide Mechanical Chip Breaker included in price of tool.
5. Only one size NP Carbide "Throway" insert used in all 3 triangular styles TA, TB and TF.
6. Six carbide cutting edges without grinding . . . insert can be indexed without resetting for size.



**NEWCOMER PRODUCTS, INC.**  
LATROBE, PENNSYLVANIA

General Sales Office: 512 Franklin Ave., Pittsburgh 21, Pa.

Other Sales Offices in Principal cities

For more data circle 538 on Reader Service Card





At new low price \$124.50  
with diamond.

**SOMERSET TOOL CO.** 320 Virginia St.  
Hillside, N. J.

For more data circle 539 on Reader Service Card

#### NEW 1955 MODEL "SS" RADIUS DRESSER

outperforms them all  
Cut production time  
without sacrificing ac-  
curacy! Easy to set, easy  
to see, eliminates nec-  
essity of guard removal.  
Somerset Radius Dress-  
er turns "tricky" jobs  
into routine operations.  
Write for free folder  
and price list.

## Get Better, More Accurate Cuts With DoALL END MILLS



Two Fluted Double End



Three Fluted Single End

### HIGH-SPEED STEEL

- Hollow ground spiral flutes... better chip removal and longer life
- "My" Helix... smoother cutting action
- Double back off... stronger cutting edges

Now—17 additional End Mill types...  
select from a complete line

### CARBIDE

Diamond ground cutting edges, lapped  
centers, non-clogging flutes

All types, sizes of H. S. Steel and Carbide  
in stock. Ask for new H. S. Steel End Mill  
Catalog—no obligation.

Call DoALL — see The DoALL Co.  
classified directory •  
for nearest DoALL •  
Service-Store, • Des Plaines, Ill.  
or write: •

45

For more data circle 541 on Reader Service Card

## JIG BORING

and  
Large Precision Machining  
Done to your specifications

We Have 16 Jig Borers

**KIDDE PRECISION TOOL CORP.**  
15 LOCUST AVENUE, ROSELAND, N. J.

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The  
"MASTER  
COMPAR"

## INDICATING MICROMETER COMPARATOR has the

**VISIBLE feel**

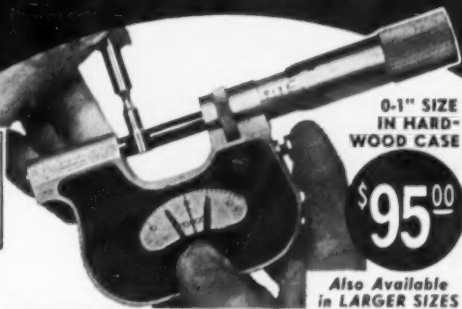
No Arguments as to correctness of reading  
due to "feel"  
Use it as Comparator, Master Micrometer, Go  
& No Go Gage.

1" Range reading in 1/10,000"

To attain permanent accuracy at these close  
limits, highest precision workmanship and ex-  
clusive design of mechanism are of Major  
Importance and ONLY found in "MASTER  
COMPAR."



Ask for Illustrated  
Circular — Code GIOFF  
Sold thru Tool Supply Houses  
Ask for Demonstration



0-1" SIZE  
IN HARD-  
WOOD CASE

\$95<sup>00</sup>

Also Available  
in LARGER SIZES

### A RIGHT HAND TOOL

Release button for movable Anvils on RIGHT Hand side  
enables you to hold tool the conventional way.

NEW — Resetting to Zero in 5 seconds

Quick adjustable tolerance hands. Heavy TUNGSTEN  
CARBIDE Anvils will actually measure Out-of-Round-  
ness, Ovalness and Taper.

**GEO. SCHERR CO., INC.**

200-MM LAFAYETTE ST. • NEW YORK 12, N.Y.

COMPLETE LINE OF  
PRECISION INSTRUMENTS

For more data circle 542 on Reader Service Card



## new shop equipment . . .

can drive from two to eight taps in automatic or semi-automatic tapping cycles. Quickly and easily mounted on a drill press, the taper can be set up for any specific operation in a few minutes. Only two adjustments—setting lower

and upper stop limits to the desired depth—are necessary to set up the unit. Once these adjustments are made, the operator merely starts the taps into the holes. Feed, depth and tap reversal functions are taken over by the taper. The unit may be used in cycle tapping operations with air or hand feed. Tapping depth is precisely controlled by an electrical depth control switch.

Pitch compensating spindles, which permit simultaneous tapping with taps of different pitch, together with a number of accessory spindles which enlarge the effective tapping area of the unit, make it an unusually versatile and adaptable production tapping attachment. The "Multi-Tapper" is available in two models. The Model 90 utilizes eight spindles with a 9-inch diameter tapping area, and the Model 50 has six spindles with a 5-inch diameter tapping area. Center distances on both models are as close as  $\frac{1}{2}$  inch. Tap capacity of each spindle on both models is  $\frac{1}{4}$  inch.

For more data circle 124 on Reader Service Card

★ ★ ★

## UNIT SPEEDS ACCURATE HEIGHT MEASUREMENTS AND SETTINGS

To bring ease and speed to accurate precision height settings and measurements from surface plates and machine tables, Brown & Sharpe Mfg. Co.,

**New KNURLMASTER**  
**Hand Knurler**  
**\$13.50**



No distortion —  
even on  $\frac{1}{8}$ " stock!  
**MODEL "C"**

For small production runs on  $\frac{1}{8}$ " to 1" stock. Exclusive screw design gives perfect knurl pattern. Furnished with 3 hardened knurls of standard  $\frac{1}{2}$ " dia. Forged steel frame is self-centering. Write for illustrated folder.

*Dealers Inquiries Invited*

**ROCKWIN MANUFACTURING CO.**

45 Rose Street

New York 38, N. Y.

For more data circle 543 on Reader Service Card

## BOSTON UNIVERSAL ANGLE PLATE

A Precision Tool  
that Holds Work  
at Any Desired  
Angle.



**Puts Speed and Profit into Angular  
Drilling, Milling, Planing, Shaping, Grinding**

With a Boston Universal Angle Plate on the job, work is quickly set up on the table and but a few seconds are required to locate it at the desired angle. Indispensable in tool rooms and extremely useful in production runs, the Boston Universal pays for itself many times over by eliminating the necessity of expensive jigs and fixtures.

**Made in several stock sizes. Write today for full information.**

**US AUTOMATIC BOX MACHINERY CO., Inc.**

10 ARBORETUM RD.  
BOSTON 31, MASS.

For more data circle 544 on Reader Service Card



## WALLS TU-WAY BELT SANDER



Full  
1/3 h.p.  
G. E. Motor

USE IT  
EITHER WAY

HORIZONTAL

VERTICAL

At last, a top quality industrial sander that provides all the most wanted features—yet sells for so little. **\$89.95**

complete with cord, plug, switch ready to use

Illustrated Literature on Request

A few desirable distributor territories still available.

**WALLS SALES CORPORATION**

333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 545 on Reader Service Card

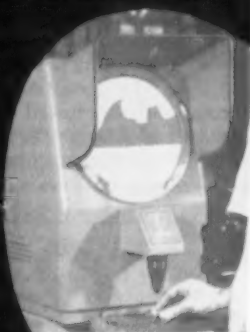
## STOP PRODUCTION ERRORS

with NEW Bausch & Lomb  
OPTICAL COMPARATOR

Sold  
Exclusively  
by DoALL

Finest,  
Lowest  
Priced,  
Quality Unit  
of its Kind

Get the Facts



Call DoALL — consult  
classified phone directory  
for DoALL Service Store  
that stocks gages, cutting  
tools, supplies, etc. Write

The DoALL Co.  
Des Plaines, Ill. 34

Checks to "tenths"

Anyone can  
operate it

Can be used  
without  
fixtures

For more data circle 546 on Reader Service Card

## BIG SAVINGS

- Cleaning and finishing metals, molds, forgings, plastics, etc.
- Removing burrs, carbon, rust, grime, paint, etc.
- Stenciling letters, designs, trademarks, etc.

Leiman Sandblasts provide the fast, low-cost, safe, uniform way to perform the operations listed above . . . whether mass production or single pieces, large or small. Easily operated by unskilled help. Well-designed, rugged, last for years, priced right.

## Cabinet Type LEIMAN SANDBLAST



### FEATURES:

- Continuous vacuum abrasive feed
- Heavy gauge welded steel cabinet
- Doors at each end
- Two arm holes with rubber gloves
- Two interior lights
- Foot pedal control
- Large viewing glass
- Use all abrasives

Write for folder and prices

**LEIMAN BROS., Inc.**

149 Christie St., Newark 5, N. J.

For more data circle 547 on Reader Service Card



## new shop equipment . . .

Providence 1, R. I., has announced the "Hite-Set," an instrument consisting of a stand having a hardened and lapped base which supports a carrier with permanently mounted precision blocks spaced 1 inch apart. A few turns of the thimble of the accurate micrometer head raises or lowers the measuring

blocks, bringing settings in 0.0001 inch increments over the entire range of the instrument. As the measuring blocks are exactly 0.5000 inch, settings can also be made from the bottom surface of the blocks, an advantage for many measurements. According to the manufacturer, the unit consistently provides precision height settings with a high degree of accuracy.

The micrometer, with a 1-inch range reading directly in 0.0001 inch increments, has a dull chrome finish with easily read jet black figures and graduations. The spindle is non-rotating and not subject to wear. Adjustment for zero setting is provided and includes a  $\frac{1}{8}$ -inch movement which can be used for setting the instrument to a reference other than the plane of the base. The unit is available in two

# 2 Seconds

### CAN SAVE YOU TWO HOURS!

Adjusting bevel gear mesh with a laminated shim is a matter of two seconds to remove a lamination!

The shim in this case is made of LAMINUM®, our exclusive material. It is a "solid" unit built up of 16 layers of .002 brass. It peels quickly and easily. Each shim removed adjusts the bevel gear position by two thousandths.

**You save time** by easier machining tolerances on the housing; **you save time** by eliminating pesky assembly machining; **you save** by not tying up a machine intermittently. **IT'S EASIER!**



SEND FOR LITERATURE

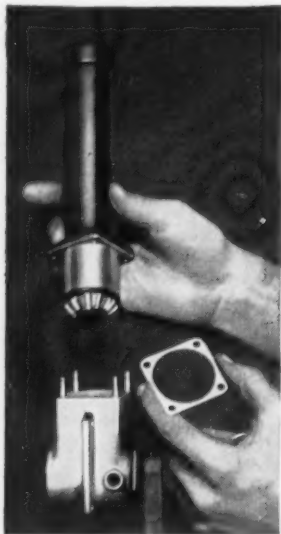
SHIM HEADQUARTERS SINCE 1913

Check Our Stampings Division  
For Your Stamped Parts Requirements

3312 UNION STREET • GLENBROOK, CONNECTICUT

For more data circle 548 on Reader Service Card

300 modern machine shop



Brown & Sharpe  
"Hite-Set" Instrument

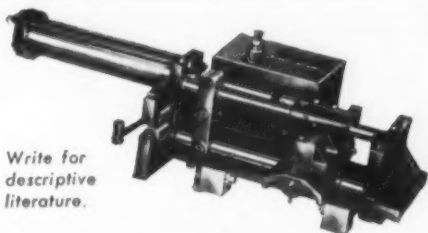
December, 1955



**COOPER WEYMOUTH**  
OPEN THROAT  
**AIR OPERATED SLIDE FEED**  
For Power Press Operation

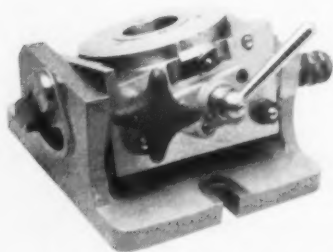
Operates on standard shop air lines. Easy to set up and adjust, holds to extreme accuracy. Made in five sizes. Feeds lengths to 36", up to 18" wide on mechanical and hydraulic presses.

**COOPER WEYMOUTH, INC., 277 Noble Ave., Bridgeport 8, Conn.**



Write for descriptive literature.

For more data circle 549 on Reader Service Card



**Another WALTER Dividing Head**

- High, Long-lasting Precision.
- Horizontal and Vertical Operation.
- 6 and 3 Minute Readings with Vernier.
- Versatility Increased by Various Accessories.

MODEL ZST

TWO-WAY TILTING

Also Universal, Semi-Universal and simpler models and precision Rotary Tables in various sizes and executions. Each Tool supplied with Test Report. Max. Permiss. error chart supplied with literature.

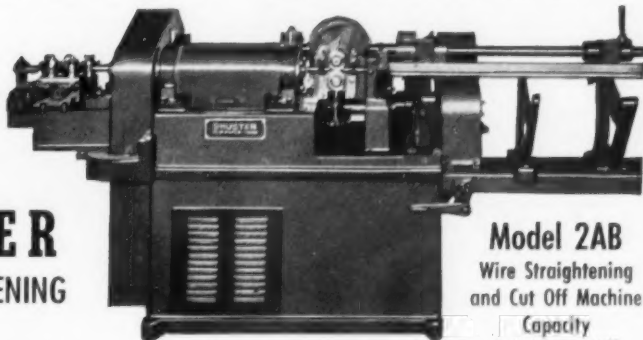
SOLE AGENTS

**KARL A. NEISE** 404 Fourth Avenue  
Dept. MMS, N. Y. 16, N. Y.

For more data circle 550 on Reader Service Card

# ECONOMY MINDED?

**SHUSTER**  
WIRE STRAIGHTENING  
and  
CUT-OFF MACHINES



**Model 2AB**  
Wire Straightening  
and Cut Off Machine  
Capacity  
3/16" - 3/8"  
Basic Wire

• There is a SHUSTER for every wire straightening job from .025 to 1 1/16" diameter. Over 30 models to select from.

Write today for our recommendation, describing your needs. No obligation whatever.

Mfd. by **METTLER MACHINE TOOL, INC., 157 Adeline Street, New Haven, Conn.**

For more data circle 551 on Reader Service Card



# QUALITY AT LOW COST

## QUEEN CITY HEAVY DUTY GRINDERS DISC GRINDERS AND BUFFERS



QUEEN CITY Heavy Duty Disc Grinders and Buffers save you money when you buy and during every hour of use. Ruggedly designed, they feature special heavy duty bearings and motors. So good they're offered on a 30-day trial, yet priced 20 to 30% under competing makes.

Choose from the complete range of QUEEN CITY Grinders and Buffers . . . floor and bench types . . . in sizes from 1/2 to 10 H.P.

**QUEEN CITY  
MACHINE TOOL CO.**

WRITE FOR FREE  
CATALOG TODAY!

**QUEEN CITY  
MACHINE TOOL CO.**

3911 Kellogg Ave., Cincinnati 26, Ohio

"High Quality—Low Cost—For Over 50 Years"

For more data circle 552 on Reader Service Card

302 modern machine shop

## new shop equipment . . .

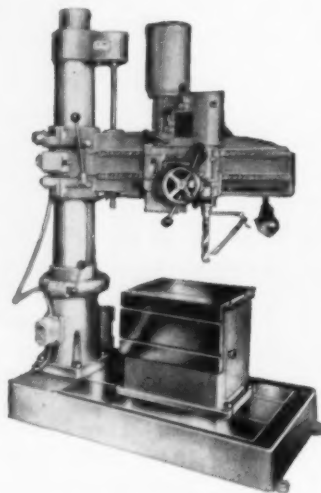
styles. The No. 582 is a 10-inch size with a rectangular base measuring  $2\frac{1}{2}$  x  $4\frac{3}{8}$  inches and is designed particularly to provide clearance for in-the-machine settings, as well as surface plate work. The No. 583 has a round base and is made in 10 and 20-inch sizes. The round base is designed especially for surface plate work and rests on a hardened and lapped bottom. The 10-inch size has a 6-inch diameter base, and the 20-inch size has an 8-inch base.

For more data circle 125 on Reader Service Card

★ ★ ★

## RADIAL DRILLING MACHINE HAS DIRECT GEAR DRIVE MOTOR

Masters Precision Tools, 3613 Archer Ave., Chicago 9, Ill., has announced a 40-inch radial drilling machine which is simply designed with a direct gear drive motor. The machine is powered by a 2-h.p. direct gear drive motor



Masters 40-Inch Radial Drilling Machine

December, 1955



**ANGLE VISES  
6 JAW  
SIZES**

SIZES  
1 1/2"  
2 1/2"  
3"  
4"  
6"  
8"

Jaws with  
SWIVEL BASES



# PALMGREN

**for MILLING MACHINES,  
DRILL PRESSES,  
GRINDERS, SHAPERS...**

64 different models and  
types of vises, rotary  
tables, milling attach-  
ments, and other ma-  
chine tool accessories.

WRITE FOR  
CATALOG #203.

**MILLING MACHINE VISES  
No. 40B and 60B  
4" and 6" Jaws  
with or without  
SWIVEL BASE**



**CHICAGO TOOL AND ENGINEERING CO., 8399 South Chicago Avenue, Chicago 17, Illinois**

For more data circle 553 on Reader Service Card



## DYKEM STEEL BLUE

**Stops Losses**

**making Dies and  
Templates**

Popular package  
8-oz. can fitted  
with Bakelite cap  
holding soft-hair  
brush for applying right  
at bench; metal surface  
ready for layout in a few min-  
utes. The dark blue background  
makes the scribed lines show up in  
sharp relief, prevents metal glare.  
Increases efficiency and accuracy.

Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301F North 11th St. • St. Louis 6, Mo.

With DYKEM Steel Blue      Without DYKEM Steel Blue

For more data circle 554 on Reader Service Card

## 3 SIZES COVER A GREAT RANGE

**PUNCH AND STRIP  
INSIDE 90°**

---

**QUICK CHANGE  
PUNCHES AND DIES**

**NOS. 7/7 1/2/8 IMPERIAL  
WHITNEY-JENSEN  
LEVER PUNCHES**

**Write for BIG NEW CATALOG**

**WHITNEY METAL TOOL COMPANY**  
720 Forbes St., Rockford, Ill., Since 1910

**CAPACITIES, MILD STEEL**

---

No. 7: 1/4" thru 1/8"  
No. 7 1/2: 1/4" thru 3/16"  
No. 8: 1/4" thru 1/4"



For more data circle 555 on Reader Service Card



## new shop equipment . . .

and has a No. 4 taper in the spindle with a drilling capacity of 1 3/4 inches. The spindle is equipped with a drill ejector so that drills can be removed without the use of a drift punch. The head of the machine can be easily moved as it travels on the dovetail with roller bearings. According to the manu-

facturer, there is a rapid traverse to raise and lower the head and arm on the column.

For more data circle 126 on Reader Service Card

★ ★ ★

## AIR MOTOR HAS ADJUSTABLE CUSHIONING

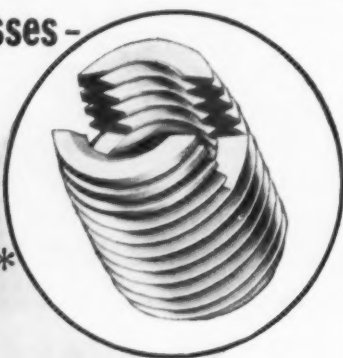
The Bellows Co., Akron 9, Ohio, has added to its air cylinder line a 2 1/2-inch

bore air motor with adjustable cushioning at either or both ends. The unit features a built-in four-way valve and speed controls. The valve is available for 8 or 110-volt momentary contact electrical control (including explosion-proof models); 110, 220, 440 or 12-volt maintained contact control; direct mechanical or manual control; air-pilot valve control; and air-poppet valve control. The cushioned air motor is available in all standard mounting styles. Operating at air pressures as high as 175 p.s.i., the unit develops a thrust equal to five times the air pressure applied. Cushioning is fully adjustable by a metering screw lo-

## Profit From Losses -

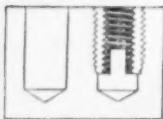
with

## TAP-LOK INSERTS\*



Although designed primarily for original equipment installation, TAP-LOK INSERTS are also widely used to repair stripped or worn threads.

Quickly and easily installed even by unskilled labor, TAP-LOK INSERTS are self-tapping and friction-locking in a single operation. No tedious hole preparation or secondary operations necessary.



U. S. Patent 2,455,685

Send for additional  
information.

1135 Hendricks Causeway  
Ridgefield  
New Jersey

\*Reg. U. S. Pat. Off.

# GROOV-PIN

CORPORATION



For more data circle 556 on Reader Service Card





## Why SCHNORR Disc Springs?

### Because:

1. Unlimited life within borders of permissible loads.
2. No creeping, initial settling or gradual fatigue.
3. Axial center pressure.
4. Exact adjustment to the desired pressure.
5. Small constructional height, large deflection.
6. Large inherent damping.
7. Large impact damping especially with multiple stacking.
8. Excellent space disposition.
9. Spring pressure, Spring length and Spring deflection can be easily determined for the same Spring size or can be changed by lengthening or shortening of the Spring columns or by multiple stacking. In special cases the character line can be made to divert from its usual straight form by diversified stacking.
10. Most Spring sizes available from stock.

• For descriptive literature write

**KARL A. NEISE**

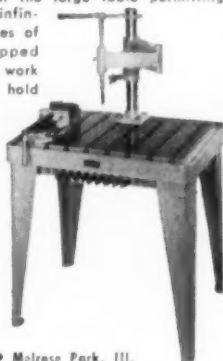
Mastertools for Modernized Machining

404 4TH AVE., Dept. MMS, NEW YORK 16, N. Y.

For more data circle 557 on Reader Service Card

## Are YOU Wasting Time? Gambling With Your Hand Tapping Job? Are Your Tapped Holes to Size and Square?

This Fixture will save you 60 per cent of your present free hand tapping time. The articulate arms swing clear of the large table permitting placing work. An infinite number and sizes of holes can be tapped without moving the work piece. Vise will hold work as small as 3/8" square. The tap floats and locates itself in the hole. Taps are held in individual spindles, requiring but a few seconds to change. Write for pamphlet.



**TOOLS, Inc.**

1734 No. 25th Ave. • Melrose Park, Ill.

For more data circle 558 on Reader Service Card

December, 1955

## this <sup>(H)</sup> HARGRAVE clamp



No. 44  
Forged  
Steel

is surprising a  
lot of people



The No. 44 series is designed for production application where strength and durability are essential.



FORGED STEEL FRAME  
HEAT TREATED  
WIDE CHOICE OF SIZES  
EASILY ADJUSTED  
POSITIVE GRIP

Your low priced "Extra Hand" in production.

Ask Your INDUSTRIAL DISTRIBUTOR for a copy of the NEW No. 65 Selection - Application Catalog or write us.

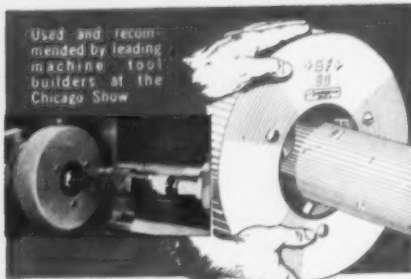
**THE CINCINNATI  
TOOL COMPANY**  
1947 Waverly Avenue  
Cincinnati 12, Ohio

For more data circle 559 on Reader Service Card

modern machine shop 305



# SKINNER +GF+ WORK DRIVERS



## • FAST • POWERFUL •

*The Best for Turning on Centers*

**+GF+** Work Drivers are the ideal means of driving smooth or rough bars and forgings located on centers. Jaws easily reversed to accommodate direction of spindle rotation.

### MADE IN FIVE SIZES

To accommodate work from  $\frac{1}{4}$ " to  $8\frac{1}{16}$ " diameter

- $\frac{1}{2}$  turn does clamping — no wrenches needed
- Each size has wide clamping range
- Cuts clamping and unclamping time
- Clamps out-of-round work evenly
- Clamping force always matches cutting pressure

*Write Skinner or your nearest Skinner distributor for illustrated folder.*

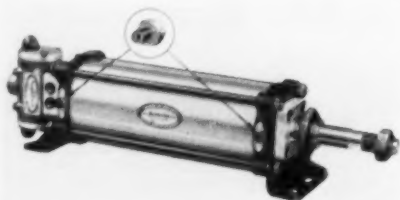


THE **SKINNER**  
**CHUCK COMPANY**

210 Edgewood Avenue, New Britain, Conn.  
For more data circle 560 on Reader Service Card

306 modern machine shop

*new shop equipment . . .*



**Bellows Adjustable-Cushioning Air Motor**

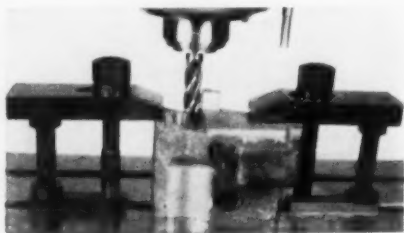
cated in each cushioned head. Metering screws are equipped with locknuts to prevent changes of settings during operation. Cushioning is effective on the final  $\frac{3}{4}$  inch of the stroke.

For more data circle 127 on Reader Service Card

★ ★ ★

## HOLD DOWN UNIT SAVES VALUABLE SET-UP TIME

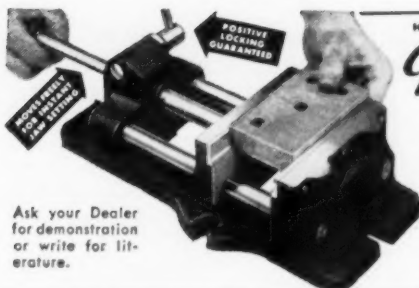
Identified as the "Hold All," a modern hold down unit which saves valuable set-up time and which will not mar or deface the machine table or surface has been announced by D.S.O. Mfg. Co., 5 Harvard St., New Britain 22, Conn. The hold down unit has a capacity range of from  $\frac{1}{2}$  to  $6\frac{3}{4}$  inches high and is made of alloy steel, heat treated and black oxide finished for life-time service. According to the manufacturer, the unit provides neat looking work



**D.S.O. "Hold All" Hold Down Unit in use**

December, 1955





Ask your Dealer for demonstration or write for literature.

HEINRICH  
*GripMaster*

## GRIPS WITH SPEED CUTS TOOLING COSTS

Step up drill press production with the Heinrich "Grip-Master" Screwless Vise—with the patented "Circle Grip" hammer blows cannot break. Work is automatically leveled; jaws set instantly, effortlessly. 3", 4", 6", 8" jaw widths; ideal as base structure for drill jigs and fixtures.

**HEINRICH TOOLS, INC.**

DEPT. M-115

RACINE, WISCONSIN

For more data circle 561 on Reader Service Card



## NEW ...ETALON #17

- VERNIER AND SCALE IN DULL CHROME FINISH
- Hardened Stainless Steel

- Clear, wide Vernier slide
- Easier to read
- In handsome contour case

Ask your dealer, or write:

**ALINA CORPORATION**

401 Broadway  
New York, N. Y.

For more data circle 562 on Reader Service Card



# POWEROLL

NEW MEDELTON AUTOMATIC COIL CRADLE  
**SAVES LABOR! SAVES MONEY!**  
DESIGNED FOR GREATER EFFICIENCY AND  
SAFETY IN HANDLING COIL STOCK



- Roll on your coil and it's ready to go.
- Screw operated separator plate.
- No lifting, no pull, no accidents.
- Slack loop permits faster feeding.
- No drag on feed or dies. Eliminates pull, operator fatigue and spoilage.
- Can now be equipped with Pinch Roll attachment.

Phone or write for new folder • Dealer inquiries invited.

**WM. HALPERN & CO., Inc.**

MACHINE TOOLS

100 STEVENS AVE., MOUNT VERNON, N. Y.

R 104  
1000 lbs. Cap.  
R 204  
2200 lbs. Cap.

For more data circle 563 on Reader Service Card



## new shop equipment . . .

areas as it requires no shelves, blocks, bolts, shims, and so on. Everything needed is packed in a handy box ready for instant use.

For more data circle 128 on Reader Service Card

## MULTI-PURPOSE MACHINE MARKS PRACTICALLY ANYTHING

The A. A. Gage Co., 350 Fair St., Detroit 20, Mich., has announced the "Panto Marker," an advanced precision machine, operating on the pantograph principle, which is designed to mark soft and hardened materials, plas-

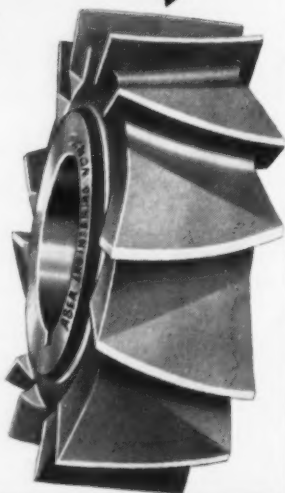
tics, fibers and practically anything using the electric etch, vibro etch, acid etch and engraving methods. The unit is a multi-purpose versatile machine which employs all of the aforementioned methods, thus providing economy in the purchase of only one unit to serve all requirements. A font of letters and characters are furnished from which inscriptions can be arranged, and by tracing them, the inscriptions are transferred by the pantograph arrangement to the stylus or diamond point and impressions made on the object. Markings are sharp and clear and can be made in a range

# ABER Curved Tooth MILLING CUTTERS ARE Better...

## here's 5 reasons Why

1. Give More Accurate Control of Limits and Finish
2. Elimination of Chatter and Breakage
3. Extended Cutter Life
4. Better Performance
5. Increased Production

Patented Curved Tooth Design of all Aber Cutters permits faster, easier operation, because the curve of the tooth face is built up and strengthened at the corner of the tooth which first enters the cut. This makes possible a *SHEARING ACTION* and eliminates the shock of contact with the work. Dissipation of heat is faster, eliminating friction. . . . Write today for complete information.



### FREE DATA

on "How to Sharpen Curved Tooth Milling Cutters".

## ABER ENGINEERING WORKS

WATERFORD, WISCONSIN

For more data circle 564 on Reader Service Card



## RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

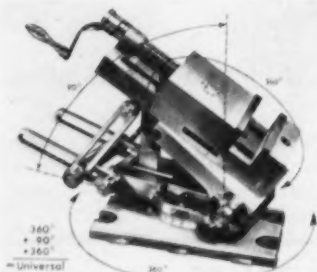
Our catalog contains a wide variety of press types and sizes. Write for it today.

\*51st year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, Toggle and Straight Side Presses, Dial and Roll Feeds.

**ZEH & HAHNEMANN CO.**  
190 VANDERPOOL ST. NEWARK 5, N. J.

For more data circle 565 on Reader Service Card

## PREWO PRECISION TOOLMAKERS VISE All Compound Angles — Universal



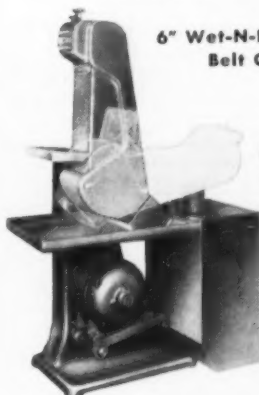
- Rigid and Low Height with Sine Table. • Heavy Chip Removal, High Accuracy, No Vibration.
- Machine and Measure in same Setting. • Often eliminates costly Jigs & Lengthy Setup Time. •
- Fast Setting with Precise Scales and Vernier. Can also be done with Gage Blocks. • All Bearing and Contact Surfaces are Fine-Ground exactly Right-Angled and Plane Parallel with a Tolerance of  $\pm .0004''$ . • Also Precision Machine Vises with Underdraw—No lifting of jaws.

Exclusive Factory Representative:

**KARL A. NEISE** 404 4th Ave., Dept. MMS  
New York 16, N. Y.

For more data circle 567 on Reader Service Card

*Hammond*  
OF KALAMAZOO



6" Wet-N-Dri Abrasive  
Belt Grinder

### For FLAT SURFACING

- Castings
- Forgings
- Plastics

Vertical or  
Horizontal  
Operation

WRITE FOR  
CATALOG

*Hammond Machinery Builders—*

1615 Douglas Ave., Kalamazoo, Michigan

For more data circle 566 on Reader Service Card

## Rivet Spinning on the LINLEY is fast, low in cost and noiseless

Save time and money by putting your riveting on the LINLEY RIVETER. Send us samples of your work and we'll gladly and without obligation give you estimates on the time and cost of handling your work the LINLEY way.

Available in sizes and types for iron and cold rolled steel rivets up to  $\frac{3}{4}''$ ; larger rivets of softer materials can also be handled.

Send for Bulletin R TODAY!

**LINLEY BROTHERS CO.**

671 State St. Ext., Bridgeport 1, Conn.



For more data circle 568 on Reader Service Card



## new shop equipment . . .

of sizes from 1/32 to 3/16 inch in height.

The "Panto Marker" has a wide capacity, yet it is compact, taking up little space. The work table travels up and down by means of a convenient

**Accurate Hole Transfer Made Easy With  
NIELSEN TRANSFER SCREWS**

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.

Write for Circular  
**NIELSEN TOOL &  
DIE COMPANY**  
P. O. Box 1067  
Berkley, Mich.



For more data circle 569 on Reader Service Card

**Mold your own LEAD HAMMERS**

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it". Simple to operate.

Write  
for circular  
and prices

**LAWRENCE H. COOK, INC.**  
67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.



COMPLETE  
LEAD HAMMER  
SERVICE

For more data circle 570 on Reader Service Card


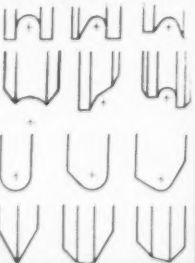
**WHY WASTE TIME?**

Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

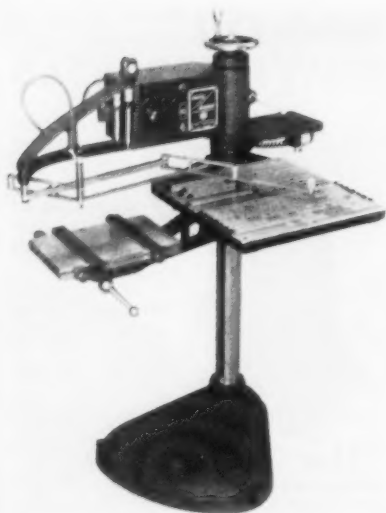
Write for Price and Folder.  
Representatives Wanted.

**JEON MANUFACTURING CO.**  
P. O. BOX 6750 WASHINGTON 20, D. C.

Patented

For more data circle 571 on Reader Service Card



"Panto Marker" Multi-Purpose Marker

handle and will accommodate a maximum part up to 32 inches in height with unrestricted width. The table also adjusts laterally or circularly.

For more data circle 129 on Reader Service Card

★ ★ ★

## SLIDING HEAD FLOOR DRILL

A 21-inch sliding head floor drill which is available with a box or round column, and box column types in multi-spindle arrangements has been an-



**CAM MILLING**  
  
**JIG BORING**  
 A SPECIALIZED CAM  
 MILLING SERVICE,  
 JIG BORING  
 ... SPOT WELDING  
 ... CONTRACT PRODUCTION  
 EXPERIMENTAL DEVELOPMENT

SEND FOR NEW CATALOG NO 32-CN

**EISLER ENGINEERING CO., INC.**  
 734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 572 on Reader Service Card

**GEARS**  
 In Stock—Immediate  
 Delivery  
  
 Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 20

**CHICAGO GEAR WORKS**  
 440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 573 on Reader Service Card

**THE VISE WITH A  
 THOUSAND GRIPS**



**'FLEXIBLE JAWS'** grip all shapes. Grips secure and positive for precise milling, drilling and cutting operations. Eliminate the time and expense of blocking and shimming irregular pieces for toolroom machining. Applicable on any machine tool. Try it in your shop. Save time and dollars on small production runs.

**WRITE FOR INFORMATION TODAY!**

At the Philadelphia Show—Booth 2047



**AMERICAN POSITIVE GRIP VISE CORP.**

6-F Olivine St., Willimansett, Mass.

For more data circle 574 on Reader Service Card  
 December, 1955

**KING SIZE  
 GUARDS**



no problem for



**LITTLEFORD**

**Guards, bases and pans—**  
 any shape, almost any size—fabricated better and faster at Littleford. 175,000 sq. ft. of modern plant and equipment, and over 73 years fabricating experience will save you real money. For prompt estimates, send your blueprints to Littleford Bros., Inc., 433 E. Pearl St., Cincinnati 2, Ohio.

For more data circle 575 on Reader Service Card  
 modern machine shop 311



## new shop equipment . . .

nounced by Cincinnati Lathe and Tool Co., 3265 Disney, Cincinnati 9, Ohio. According to the manufacturer, every important element of the drill is built-in and conveniently located for operator comfort and pleasing appearance. The

machine is supplied complete with motor and controls and is ready to operate as soon as power leads are connected to the factory-installed, fully-enclosed electrical panel built into the drill. An interlock is built into the door of the panel to prevent opening it unless the disconnect switch is in the "off" position. A transformer is also supplied, operating on 220 volts or over to reduce voltage at the push-button station to 110 volts.

For easy drilling and high production, the drill is furnished with geared power feed as standard equipment. A simple selector is used to obtain any of four rates of feed which are engaged through a positive jaw clutch. The entire power feed mechanism is built-in and completely housed in the head. The

## For PRECISION holes in QUANTITY here's a gage with many advantages



### GET OUR NEW BULLETIN

and survey the facts of this rapidly growing quality control method.

**COMTORPLUG** with interchangeable expanding plugs to gage simple or special bores from  $\frac{1}{8}$ " to 8" dia.

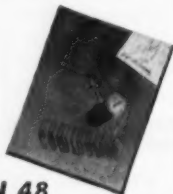
### Unique Advantages

- Positive gaging accuracy to fraction of .0001" regardless of who operates it.
- Indicates actual size, a fixed—not passing—reading.
- Positive 2-point gaging—automatic centering.
- Shallow holes, deep holes, inside splines, open-end holes gaged easily.
- Detects ovality, back or front taper, bell mouth, barrel shape.
- Reaches to bottom of blind holes.
- Gages work while still held in chuck.
- A shop tool for all-day every day use.
- Portable—no wires, hoses or stands.

Investigate the gage used by the thousands in jet engine, automotive transmission, household appliance, farm machinery, guided missile and other volume-precision plants. **IT MAKES PRECISION GAGING EASY . . .** at machine . . . at inspection bench . . . for selective assembly. No other like it—investigate and see why.

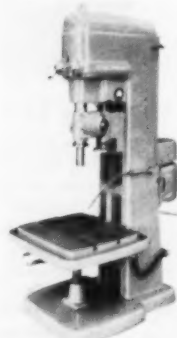
### COMTOR COMPANY

64 Farwell St.  
WALTHAM 54,  
MASS.



### GET THE FACTS—REQUEST BULLETIN 48

For more data circle 576 on Reader Service Card



Cincinnati 21-Inch  
Sliding Head Floor  
Drilling Machine





## **It Costs No More To Give More— If You Give The Bonus In Savings Bonds!**

If your company is one of the more than 45,000 companies that have the Payroll Savings Plan you *know* what your employees think of Savings Bonds—they spell it out for you every month in their Savings Bond allotments.

If you don't have the Payroll Savings Plan, and are wondering whether your people would like to receive their bonus in Bonds, here are a few significant facts:

—every month, *before they get their pay checks or envelopes*—8,500,000 men and women enrolled in the Payroll Savings Plan invest \$160,000,000 in U. S. Savings Bonds.

—Payroll Savers hold their Bonds: From May 1, 1951, to September 30, 1955, approximately \$18.7 billion E Bonds reached 10-year maturity dates. On

September 30, 1955, approximately 70.3% of the matured bonds were retained by their owners under the automatic extension plan. With additional interest earned since maturity dates (\$560 million), cash value of the matured bonds held by individuals amounts to approximately \$13.7 billion. —on September 30, 1955, the cash value of Series E and H Bonds—the kind sold only to individuals—totaled 39.7 billion dollars, a new high.

To the Payroll Saver, and to the man who buys his Bonds at a bank (because his company does not provide the Payroll Savings Plan) a One Hundred Dollar Savings Bond looks bigger and better and is bigger and better, than a check for \$75. *Make this a merrier Christmas for every employee. Give the gift that keeps on giving.*

*The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and*

**MODERN MACHINE SHOP**





## new shop equipment . . .

spindle is mounted in tapered roller and ball bearings which accommodate radial and thrust loads. The motor is ac-



### MASTER GRIPPING CLAWS System Hubner WHY use them?

1. Clamping action Vertical as well as Horizontal—pressing workpiece down directly on the machine table. No hammering and still no air between. 2. Gain more working room. 3. Faster and more secure setups. Easier to handle. 4. Unlimited jaw opening. 5. No straps overlapping on the workpiece; more machining surface. 6. Extremely versatile—take light cuts or heavy cuts, use on small machines or heaviest production machines.

Exclusive Agents

**KARL A. NEISE**

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N. Y. 16, N. Y., Dept. MMS

For more data circle 577 on Reader Service Card

## STANDARDIZED MICRO DRILL GUIDES

All standard body styles available with hole sizes from  $\frac{1}{80}$  to  $\frac{1}{32}$ ". Tolerances of .0002 maintained on I.D., O.D., and concentricity.

ENGINEERED MICRO-TOOLING, DRILLS,  
JIGS, COLLETS, ETC.

MICRO  
DRILL  
GUIDE



3980  
Superior Ave.,  
Cincinnati 36,  
Ohio

For more data circle 578 on Reader Service Card



## SPEEDY and SAFE CASE HARDENING WITH NO SPECIAL EQUIPMENT

Indispensable for Machine Shops, Schools, Tool Rooms, Etc.  
1 lb., 5 lb., 10 lb., 25 lb., 50 lb., 100 lb. containers.

**KASENIT COMPANY**  
799 GREENWICH STREET BOX G NEW YORK 14, N. Y.

For more data circle 579 on Reader Service Card

cessibly mounted to the rear of the machine, and a unique tilting motor bracket is provided to make spindle speed changes easy. No wrenches are required and both hands are free to shift the V-belt to the proper position. A belt guard is supplied as standard equipment. The machine is rated at  $1\frac{1}{2}$  inches in cast iron with a 2 or 3-h.p., 1,800 or 1,500-r.p.m. motor. A No. 4 Morse taper spindle is standard; however, a No. 3 Morse taper spindle is optional if specified.

For more data circle 130 on Reader Service Card

★ ★ ★

## MACHINE FOR FULL THREE- DIMENSIONAL PANTOGRAPH- MILLING PERFORMANCE

Designated as the Model 3A "Panto-Miller," a machine which is specifically designed for full three-dimensional pantograph-milling performance has been announced by Johnson & Bassett Inc., Production Tool Division, Worcester, Mass. It is a versatile, tracer controlled production machine for engraving, profiling, die cutting and milling. By using heavy base and arm-support construction, more than adequate bearing specification and precision machining at all critical points, a unique stability and sensitivity balance has been engineered into the machine, according to the manufacturer. Panto-



# WHOOT MON!



You really get your money's worth when you buy precision screw machine products made by "you know W.H.O.\*"

**CAP SCREWS • COUPLING BOLTS  
SET SCREWS • MILLED STUDS**

... our specialty.

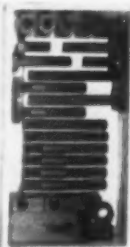
*\*Wm. H. Ottemiller Co.*  
**YORK, PENNA.**



## HOLD-ALL

**THE MODERN HOLD DOWN UNIT**  
CAPACITY RANGE  $\frac{1}{8}$ " TO  $6\frac{3}{4}$ " HEIGHT.

Advantages: 1. Saves valuable set up time. 2. Will not mar or deface machine table. 3. Made of alloy steel, heat treated and black oxide finished, for life time service. 4. Tidy work areas, no need for shelves, blocking, bolts, shims, etc. 5. Ready for instant use. 6. Safer, no blocking to fall on tables, side of shapers, lathe face plates. Stays together when T-bolt is loosened. 7. Complete as shown \$24.50. Dealers wanted.



**D.S.O. MFG. CO.**  
5 HARVARD STREET NEW BRITAIN 22, CONN.

For more data circle 580 on Reader Service Card

For more data circle 581 on Reader Service Card

## SPRING LOADED LIVE CENTER



Eliminate "Cold Welding" of your center. Use the accurate, rugged, reliable \*NIROL. The spring loaded Live Center that compensates for expansion and contraction in high speed operations.

Write for complete information.

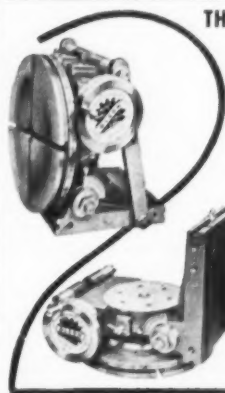
\*Reg. U.S. Pat. Off.

**\*NIROL MANUFACTURING COMPANY**

901 H'WAY 22, N. PLAINFIELD, N. J.

For more data circle 582 on Reader Service Card

December, 1955



## THE TWO IN ONE

**COMBINATION  
ROTARY TABLE  
AND  
ANGLE PLATE**

**PRECISION  
ACCURACY**

**WORM adjustable from  
0 to 90  
degrees.**

**VERNIER  
control to  
within**

**WRITE FOR FOLDER 2 seconds of Arc.**

Makers of Helical Gear Speed Reducers,  
Worm and Gear Speed Reducers, Stand-  
ard and Special Gears, Wedge-Lock  
Turret for Lathes and Turret Lathes.

Open territory available to representatives

**OLSON INDUSTRIAL PRODUCTS, INC.**

40 W. WATER ST. • WAKEFIELD, MASS.

For more data circle 583 on Reader Service Card

modern machine shop 315



**new shop equipment . . .**

graph ratios of the machine vary from 1:1.5 to 1:10, and the cutter and tracer heads may be transposed for making enlarged reproductions. A special aligning bar and forming guide bracket are supplied as standard equipment.

*Boyar-Schultz*  
**COPPER HEAD LAPS**  
(STANDARD and EXPANSION)

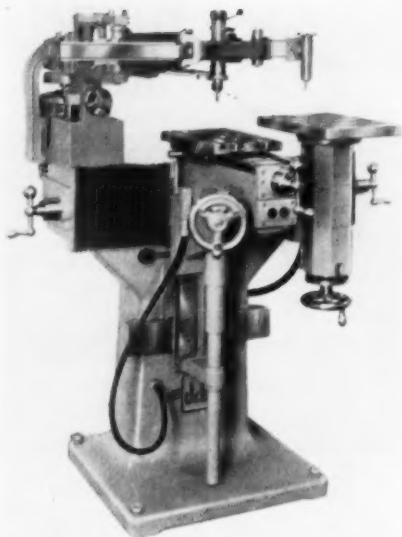
It is less costly and quicker to use Boyar-Schultz Copper Head Laps, than to make your own. Copper Head Laps are accurate and rapid to use. Nothing to wear out but the copper sleeve which is replaceable and adjustable to the correct size. Adjustment permits maintaining lapping size till worn out and replaced with new ones. Available from stock in standard sizes,  $\frac{1}{8}$ " to  $2\frac{1}{2}$ " diameters.

**SPECIAL TOOL MAKERS  
BENCH LAP SET**

Consists of seven most commonly used sizes —  $\frac{1}{8}$ " -  $3/16$ "  
 $\frac{1}{4}$ " -  $5/16$ " -  $3/8$ "  
 $7/16$ " -  $1/2$ ", with enameled die cast base.

**BOYAR-SCHULTZ CORPORATION**  
2020 South 25th Ave., Dept. F-L, Broadview, Ill.

For more data circle 584 on Reader Service Card



Johnson & Bassett Model 3R "Panto-Miller"

The "Panto-Miller" is claimed to offer advantages in work-holding capacity, especially in the thickness of work-pieces which can be accommodated. The spindle speed is infinitely variable from 1,000 to 12,000 r.p.m., under instant finger-tip control. The ground work-table surface measures 8 x 14 inches. The copy table, also machine ground, is  $10\frac{1}{2}$  x 16 inches and swivels 360 degrees.

For more data circle 131 on Reader Service Card



SOLID TYPE

**Hardened and Ground  
Tool Holder Bushings**

These new tool holder bushings are hardened and ground and priced lower than conventional soft bushings. Most sizes in stock for prompt delivery.  $\frac{3}{4}$ " to  $3\frac{1}{2}$ " O.D.—any bore. Send for descriptive literature.

**THE GAHR MACHINE CO.**

19195 ST. CLAIR AVE.

CLEVELAND 19, OHIO



SPLIT TYPE

For more data circle 585 on Reader Service Card





insist on famous

**"Jorgensen"**

**"C" CLAMPS**

Also bar clamps, hinged clamps, spring clamps, etc.

ASK YOUR SUPPLIER  
Send For Free 32-Page Catalog  
**ADJUSTABLE CLAMP CO.**

"The Clamp Folks"

**RUGGED!**

436 N. Ashland, Chicago 22, Ill.

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## HAND KNOBS



**6 SIZES CAST-IRON**

Tapped, Reamed  
or Blank  
Hex-shaped hub for  
extra tightening

Write for catalog

**TIETZMANN TOOL  
CORPORATION**

DEPT. HK-1

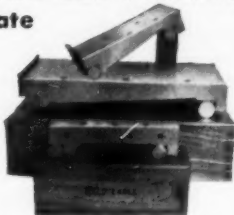
ENGLEWOOD, OHIO

For more data circle 587 on Reader Service Card

## ACCURATE—LOW COST SINE BARS and PLATES

**5" Sine Plate**

only  
**\$37.50**



Sine Plates and Bars

- Guaranteed Accuracy
- Precision Ground
- Hardened Rolls
- Double Normalized
- Tapped Holes
- End Plates
- Solid Oak Case Extra

No.	Cont. Dist.	Width	Price	With Oak Case
1605	5"	3"	37.50	43.00
1610	10"	5"	87.50	95.00
1705	5"	1"	21.75	25.25

FOB St. Paul.

Accurate to .0002" in center distance and parallelism for the length of the tool. Order Today—from your dealer or direct.



**Bald Eagle Tool Co.**

357 Minnesota St.

St. Paul 1, Minn.

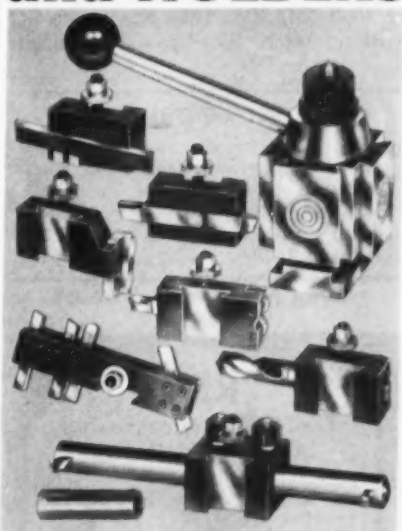
For more data circle 588 on Reader Service Card

December, 1955

## GET THE MAXIMUM from your lathes by using the **ALORIS "Quick Change"**

patented

## TOOL POST and HOLDERS



Only a second to change tools for turning, facing, drilling, boring, threading, knurling, cutting off or any other operation.

- GREAT REPETITIVE ACCURACY.
- RUGGED CONSTRUCTION.
- TESTED AND RECOMMENDED BY LEADING LATHE MANUFACTURERS.
- GREATER RIGIDITY.
- SAVES 90% IN SET-UP TIME.
- UNCONDITIONALLY GUARANTEED.

Write for catalog and price list.

MANUFACTURED BY

**ALORIS TOOL CO., INC.**

131-37 SANFORD AVENUE  
FLUSHING 35, N. Y.

For more data circle 589 on Reader Service Card

modern machine shop 317



**new shop equipment . . .**

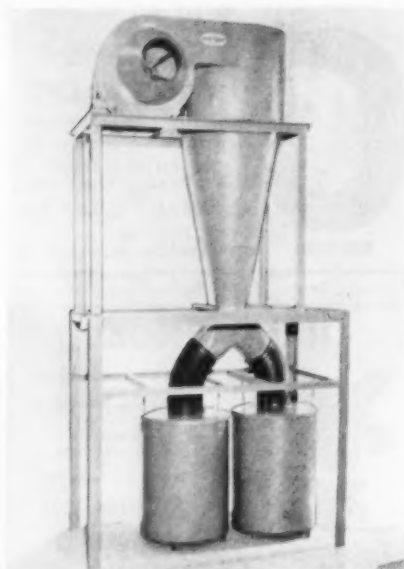
### **DUST COLLECTOR HAS LARGE DUST STORAGE CAPACITY**

Designated as the 30NW50, a Dust-kop dust collector which is designed to be used where large dust storage capacity is necessary has been announced by Aget Mfg. Co., 1398 E. Church St., Adrian, Mich. The unit has an air

#### **CENTERLESS GRINDING**

Brown & Sharpe and Swiss Automatic screw machine parts, aircraft and standard, heat treated and ground if necessary. Send blue prints for estimates. 27 years serving industry. The Porter Machine Co., Cincinnati 9, Ohio.

For more data circle 590 on Reader Service Card



**Aget 30NW50 Large-Capacity Dust Collector**

handling capacity of 3,600 cubic feet per minute, with a static pressure of 6 inches of water. The collector, it is claimed, is capable of collecting dust from practically any dust-creating machine or operation, especially where the dust volume runs to rather high bulk. The unit eliminates the emptying of

## **REID**

### **Tool Room Accessories C.I. Hand Wheels**

Fine grain cast iron. Rims and handles are ground and polished to high lustre. Top quality. Many sizes. Low prices.

There's a wide line of REID Accessories such as C.I. Hand Knobs, Machine Handles, Ball Handles, Spherical Washers and many other items at low prices.



**COUNTER BALANCED**



**SOLID WEB**

**FREE**  
NEW 60-Pg.  
**CAT.**

**REID TOOL SUPPLY CO.**  
MUSKEGON HEIGHTS, MICHIGAN

For more data circle 591 on Reader Service Card

**GRIND THE**  
***Eastern Centerless  
Way***

Our new plant with  
increased facilities  
assures

**PROMPT SERVICE**

**Eastern Centerless Grinding Co.**  
470 Tolland Street East Hartford 8, Conn.

For more data circle 592 on Reader Service Card



a regular dust bin by shovel, with the addition of two rubber casters, roller dust cans that are connected to the collector by an all metal diversion Y.

The 30NW50 is available as a recirculating air unit, or with attachments for outside exhaust where state codes or the nature of the type of dust prohibits recirculation of the air within the plant.

For more data circle 132 on Reader Service Card

★ ★ ★

## HEAVY-DUTY CLUTCH

Rockford Clutch Division, Borg-Warner Corp., 300 Catherine St., Rockford, Ill., has announced the "Morlife" Clutch which is best adapted for heavy-duty machines, such as tractors, trucks, bulldozers, earth movers, graders and other heavy machines. The clutch pro-

vides unusual torque capacity and permits the use of small diameter clutches. Heat dissipation is said to be minimized, and torque does not fade as heat increases. The clutch is recommended for use only when specifically engineered into the machine in which it is to serve.

For more data circle 133 on Reader Service Card

## READING BENCH KEYSEATER

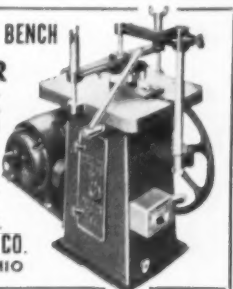
Portable—move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

Low first cost—prompt delivery.

Good dealers wanted.

**READING MACHINE CO.**  
CINCINNATI 37, OHIO



For more data circle 593 on Reader Service Card

**BEVERLY**

## *Pneumatic* THROATLESS SHEAR

**FASTER, EASIER CUTTING**  
*to any Shape!*

- Compactly built for maximum visibility and efficiency
- Operates on 35 to 150 PSI air pressure
- Adjustable power and return stroke length and speed

Beverly Pneumatic Shears combine all the advantages of Beverly Throatless Shears with fast, effortless cutting action through air cylinder operation. Air operation speeds work, permits accurate cutting to a pattern or template, as operator can concentrate on guiding work through the shear. Flow control valves permit precise adjustment of stroke speed; adjustable actuating arm controls stroke length. Foot Switch permits operator to use both hands on the work piece. Operates on 110V. 60 cycles AC and 35 to 150 PSI air pressure.

See your nearby Beverly Distributor

Write for catalog  
sheet and  
complete details.

**BEVERLY SHEAR MANUFACTURING CO.**  
3000 W. 111th STREET • CHICAGO 43, ILLINOIS

For more data circle 594 on Reader Service Card



CAPACITY  
3/16" MILD STEEL  
10 GA.  
STAINLESS



## where to get it

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# Get Into Production Quicker on Every Job



## Buck



### AIR CHUCKS

You can save from several minutes to many hours on every set-up for your chucking machines with the Buck Adjust-Tru power chuck.

Jaws can be machined in the tool room—and hardened if you wish—since there is no need for extra machining on the turret lathes to fit jaws to the work. Final accuracy adjustments are made by the chuck . . . *in a matter of minutes* . . . holding work under full air pressure!

Jobs can be run intermittently *without re-truing jaws*. On new runs and re-runs accuracy within .001" is guaranteed.

You can make drastic cuts on down-time with Buck air chucks. Write for full details today.

### Hardened Key Ways Standard Feature

Hardened key ways of the Buck, combined with hardened jaws, let you run thousands more pieces (holding tolerances within .001") than conventional chucks. You can use hardened jaws for all operations since final accuracy adjustments are made by the chuck. No need to grind and fit jaws on the chucking machine. Hardened key ways are a *plus* feature of the Buck, at no additional cost.

Buck Air Chucks are made in 6", 8", 10", 12" diameters—2 or 3 jaws. NO PRICE PREMIUM.

## BUCK TOOL COMPANY

1412 SCHIPPERS LANE • KALAMAZOO, MICH.

For more data circle 595 on Reader Service Card

December, 1955

modern machine shop 321



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# **FASTER SAFER HANDLING**

**OF LARGE AND  
SMALL SETS**



**SUPERIOR**  
PRECISION  
ALL STEEL

## **DIE SETS**

**Large Sets No Longer Need Be Blocked  
... Small Sets Can Be Lifted Without  
Sliding.**

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protects fingers by providing roomy gripping space on either side of the die shoe. There is no extra charge for this valuable safety feature.



### **LOCK-JAW LIFTING DEVICE**

removes the danger of handling large die sets. Positioned to insure proper balance when the set is lifted by either chain fall or crane.



### **E-Z LIFT SLING CHAIN**

is especially designed to fit the flanges of the die sets. Male jaws attached to the sling fit quickly into place for immediate lifting.

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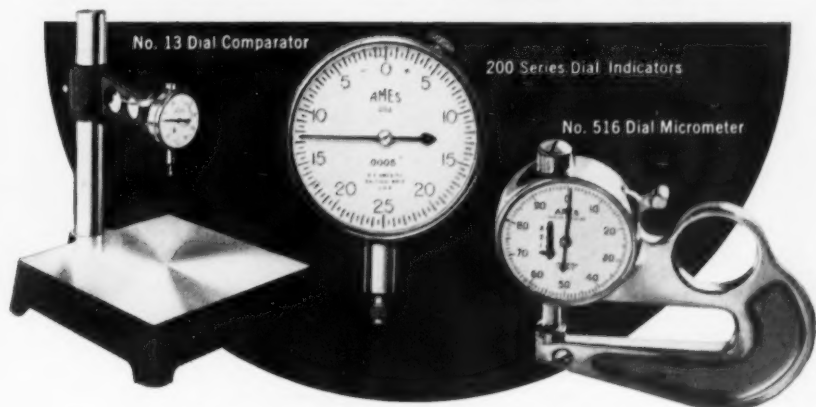
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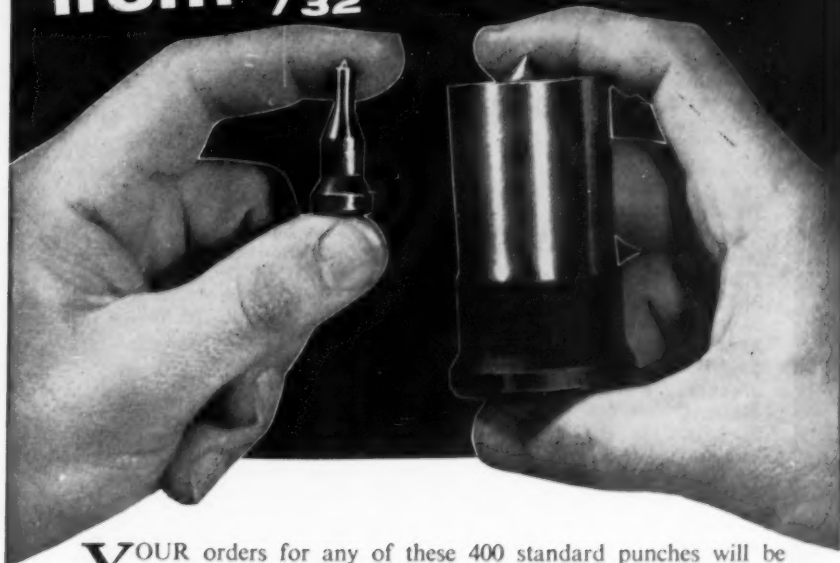
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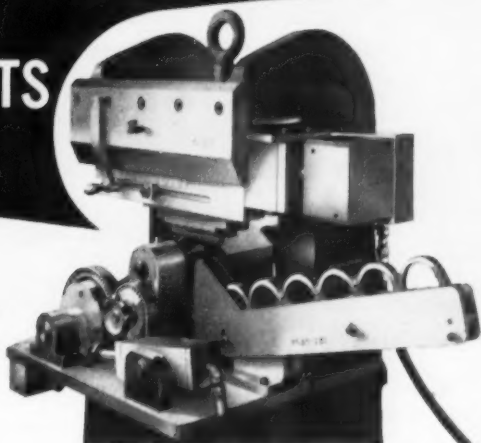
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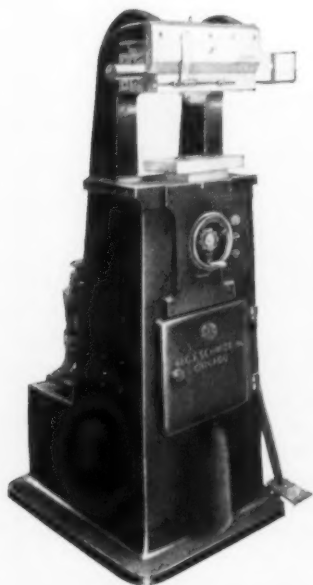
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## the last word

By Fred W. Vogel, Editor

### YEAR END VIEW

Along about this time each year, it is not at all uncommon to indulge in a bit of serious thinking about what the new year may have in store. If you care to indulge in this diversion, you'll find the ground rules are the same this year as they have been in previous years. The important rule to remember is to take what is known of one year and project it into the next.

**At this time we have no choice** other than to project the optimistic business outlook of 1955 far into the coming months of 1956. For proof we need look no further than the reports of billions to be spent for expansion in the electric power, aircraft, appliance and automotive industries, as well as the commercial and residential construction fields.

A few weeks ago Ford Motor Company announced a multi-million dollar expansion and modernization program. Now Chrysler Corporation has announced its plans to spend more than one billion dollars in the next five years to expand its plants and to push research on gas turbine and other automotive engines, electronics and nuclear and solar energy.

**Electric power production is closely attuned** to all of the national business climate. As such, we must take into consideration the nearly three billion dollars which have been spent for expansion of the electric power industry this year.

Recently, Pan American World Airways announced plans to purchase 45 American-built jet transports. This order will bring new business to three plane makers and the planes themselves when later placed in service, will stimulate passenger business by their improved features. American Airlines signed an order for 30 jets.

During 1955, the value of all our output of goods and services has risen by twenty-six billion dollars to reach an all time rate of 392 billion per year. Sixty-five and a half million persons are employed, and the economy is operating close to capacity. During this year, our national income increased by over twenty billion, and investment for peace time production rose to a record level.

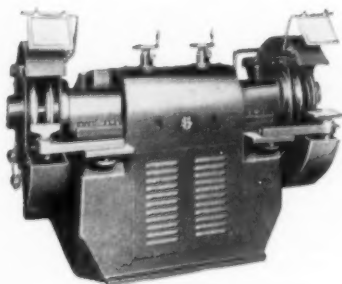
**The year ahead**, as projected from what we know of 1955, holds the promise of being the most productive year we have ever known.



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Turn out MORE WORK BETTER . . . cut grinding costs to the bone with these time-tried, reliable Grinders . . . two brilliant examples of America's outstanding line. 58 years of experience back up our claims proved in leading industrial plants.

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Model 62VS**

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Model 500**

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**THE UNITED STATES ELECTRICAL TOOL COMPANY**  
3646 Llewellyn Street, Cincinnati 23, Ohio

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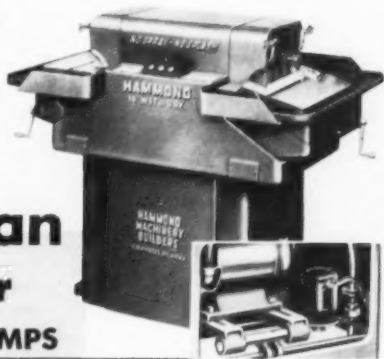
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Gushers require little or no maintenance, the ball bearings are pre-lubricated. There is no packing to worry about and the rugged construction and dynamically balanced rotating assembly cut wear to a minimum. Always specify Gusher for your coolant needs.

*Illustrated is a  
Hammond Model  
14-WD Wet or Dry  
Carbide Tool Grinder  
— the inset shows  
a Gusher Coolant  
Pump mounted inside  
the base.*

THE **RUTHMAN** MACHINERY CO.



1817 READING ROAD

• CINCINNATI 2, OHIO

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# NOBLEWEST *precision* MARKING DIES

FOR EVERY METAL MARKING NEED



Flat Die for marking round pieces



Roll Die for marking flat pieces



Embossing Dies

There's a Noblewest steel marking die for rolling or stamping sharp, clear, permanent impressions into every type of metal surface—round, flat, concave, convex and irregular contours. Long the standard for quality, Noblewest dies are made of especially selected steel, precision engraved to extremely close tolerances and heat treated for extra long wear. Each is rigidly inspected and Rockwell tested for hardness. For extraordinary quality dies at ordinary prices, specify NOBLEWEST.

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25 Westbrook Street, East Hartford 8, Connecticut.

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ORIGINATORS OF THE ROLL MARKING PROCESS

**NOBLEWEST**  
IMPROVED  
MARKING  
DEVICES

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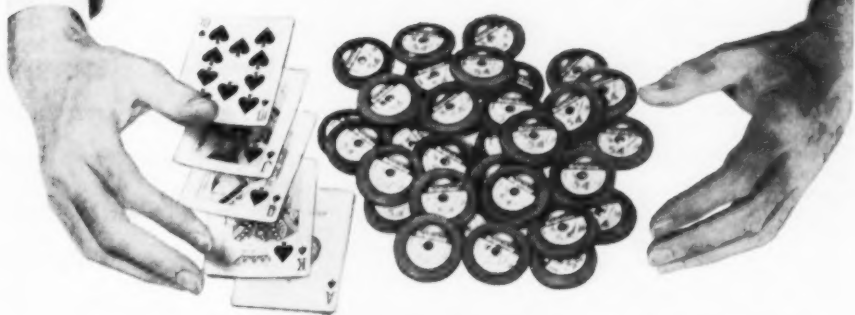
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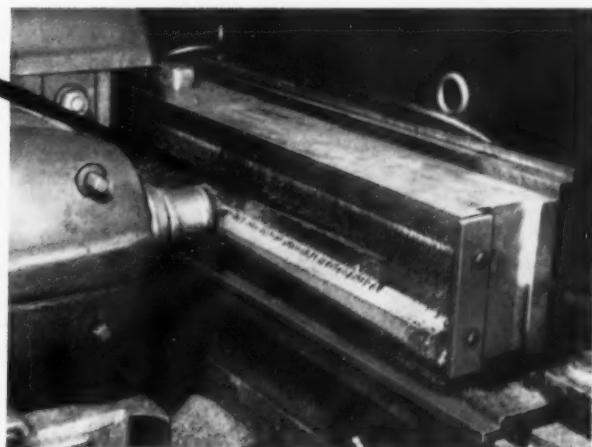
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## Hanchett Magna-Lock Magnetic Chuck at Turchan Follower Machine Co.



# REDUCES SETUP TIME 66.6%

**THE JOB:** Milling hard cast iron gibs,  $1\frac{3}{8}$ " maximum width, variable lengths,  $60^\circ$  compound angle, .250" taper per foot. Roughing cut:  $1\frac{3}{8}$ " max. width, 0.200" depth. Finishing cut:  $1\frac{3}{8}$ " max. width, 0.050" depth. Spindle speed: 385 RPM. Cutter: 8-flute carbide tip 3" dia. Table speed: 15 IPM—20 IPM. Stock removal: Approximately 4 cu. in. per min. Fixture: mechanical.

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3. Because of the several milling operations, the gib had to be removed each time and re-bolted to the fixture.

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2. Layout, drilling and tapping operations eliminated.
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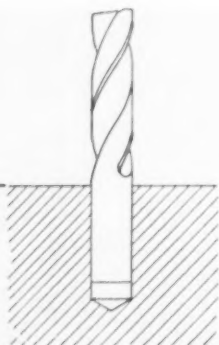
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December, 1955

modern machine shop 339





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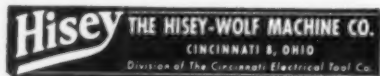
Drill a hole with a twist drill which has been sharpened in your regular manner—THEN try the shank in a hole just drilled. If the fit is snug, your present method of grinding is satisfactory if it isn't taking too much time. But if the fit is sloppy, now is the time to check further. A "HISEY" Drill Grinder can very well be the answer.



"HISEY" Drill Grinders are made in 3 sizes and several types for sharpening drills from No. 60 to 2½" diameter. They will grind straight or taper shank drills with 2, 3 or 4 flutes; also chucking drills and flat or flat twisted drills with oversize shanks. Adjustments are provided for varying the point angle and clearance angle. Machines are made in wet and dry types.

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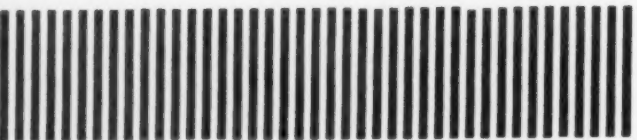
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